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ADULTERATIONS OF ESSENTIAL OILS.

BY DR. GEO. R. PANCOAST AND LYMAN F. KEBLER.

In early times technical equipments for the production of volatile oils were very incomplete, and various expedients were necessarily resorted to for the purpose of extracting the many odorous principles from the host of plant tissues; fatty products, turpentine and alcohol were frequently employed for this purpose, and consequently there was a certain justification formerly for the presence of some of these solvents in certain essential oils. But modern methods render the use of these foreign substances entirely unnecessary and they must be looked upon as adulterations pure and simple.

Adulteration is chiefly resorted to on the one hand because of its profitableness, and on the other hand because of the ignorance of the consumer and his desire to purchase as cheaply as possible. The latter frequently does not seem to care for quality, but wants quantity. It is often due to this that an honest producer may be induced to offer spurious goods, because he cannot get reasonable prices, while his competitor is able to dispose of large quantities of adulterated oils. It must not be forgotten that formerly the adulterator could ply his art fearlessly without much danger of exposure, and this probably emboldened him. To-day he is compelled to act a little more cautiously owing to the developments of the chemistry of terpenes and their derivatives, as well as a more or less complete knowledge of the composition of a number of the volatile oils. The "Black Art" of volatile oils is passing away.

The writers are fully convinced that the large distillers and reputable wholesalers are not responsible for some of the adulterated oils met with, even though they pass through their hands.

They are generally beyond their control, as will be seen by some of the subsequent remarks.

The guileless farmer or peasant who constructs a crude still and collects oils by his primitive methods (besides the impurities to be expected from this source) frequently adds a goodly proportion of a cheaper oil or synthetic sent to him by a friend in the wicked city. Synthetic oil of wintergreen is said to be largely used in this manner, and the resulting product sold for true oil of wintergreen.

The Turkish peasant in like manner and for similar reasons adds geranium oil to his rose leaves before he begins his distillation of pure otto of rose. Even John Chinaman, forced to keep "open door," manages to return the "Foreign Devils" coal oil by conscientiously "plugging" some of the essential oils which he sells, especially oils of aniseed and cassia. And the warm-blooded Sicilian, in response to an increasing demand for his goods, rejuvenates a worn-out or poor quality oil by adding the necessary constituents taken from a cheaper source; for example, oil of lemon is fortified with citral obtained from oil of lemongrass, and oil of bergamot is "pieced out" with lemon and orange oils.

Then some of the primitive distillers themselves, and possibly some of the middlemen or the jobbers, try their hands at improving nature. This is practiced in some instances to such an extent that the farther the oil travels, and the larger the number of hands it passes through, the more it adds unto itself, until finally, in some instances, at least, it is not recognized by its friends. Some of these adulterations may be due to ignorance, carelessness or accident, but many, very many, are due to design, and unless there is some improvement in this respect, we may be prepared to hear in the near future of some one liberally supplying himself with synthetics, esters, aldehydes, alcohol, oil of copaiba and plenty of French turpentine, then opening up an office with the sign "Essential Oils Made to Order While You Wait."

Essential oils are frequently met with that are unnaturally low in their characteristic constituent, so much so that, being otherwise satisfactory, only one conclusion can be drawn, viz., that they have been robbed or looted; for example, de-mentholized peppermint oil; oil of cloves, minus a large part of its eugenol; caraway, deprived of some of its carvone; and oil of lemon, abnormally low in its citral. We shall hereafter for brevity's sake call this class of

oils "looted oils." By such tactics a double profit is made by the manipulator. The consumer in these cases makes two purchases where he should make but one and save money by so doing; as for instance, he buys eucalyptol and a cheap oil of eucalyptus; then, in order to make the oil answer the proper requirements, it is necessary for him to use the eucalyptol to strengthen his inferior oil of eucalyptus.

Another matter not generally known is that certain manufacturers claim that some absolutely pure oils need to be modified so as to conform to some arbitrary standard; for example, one very prominent and reliable house lists oil of pimento at $2.10 per pound, but oil of pimento said to be made to meet the requirements of the U.S.P. is offered at $1.60. The same criticism is applied to the U.S.P. requirements for oils of bay and coriander.

Among the favorite articles used as adulterants, and to be looked for, are cheaper essential oils (turpentine, copaiba, cedarwood and gurjun balsam), alcohol and fixed and mineral oils.

PRELIMINARY TESTS.

(1) Physical appearance.

(2) A common method and a very useful one is that of exposing a drop or two of the oil on white glazed paper, and from time to time observing the odor. By this means alone, in many cases, a cheap oil can be detected, especially turpentine. Lemon and orange require from twelve to fifteen minutes; bergamot, two to four hours; lavender, twelve to fifteen hours; cloves, twenty-five hours; and sandal wood, two days, for comparison. Fixed oils leave a permanent greasy stain. Results by the above procedure give only indications, which must be verified by established methods.

Alcohol.—Several tests can be applied to give indications of the presence or absence of alcohol. Oils free from alcohol (acetone or purified wood alcohol), when dropped into water, remain transparent, but the presence of alcohol causes the globules to become opaque or milky. When a considerable amount is present, it may be approximately estimated by placing a given volume of the oil into a graduated cylinder, adding an equal volume of water, agitating well, and then setting aside until complete separation results. If there is any appreciable diminution in the volume of oil, alcohol (acetone, acetic ether or purified wood alcohol) is present. The

diminution of volume is generally proportional to the amount of adulterant. Glycerin can be used in place of water.

In order to positively establish the presence of any of the above, fractional distillation must be resorted to and the substance finally identified by means of the iodoform reaction, boiling point, etc.

CHEAPER ESSENTIAL OILS.

Turpentine generally introduces abnormalities, lower specific gravity, diminished solubility, lower boiling temperatures and disturbed optical rotation. The latter can easily be remedied by mixing the proper proportions of dextrogyrate and lævogyrate turpentines. Before a positive opinion can be given relative to the presence of added turpentine, in many cases a careful comparison must be made and the characteristic derivatives of pinene isolated.

Cedarwood, copaiba and gurjun balsam oils are generally indicated by their lesser solubilities, higher specific gravities and optical rotations, but the two latter can readily be adjusted by the proper kind and amount of turpentine.

Mineral oils (petroleum, kerosene, etc.) are generally revealed by their insolubility and indifference to the action of strong acids and alkalies. They may be variously isolated, by their insolubilities, polymerizing the oil with concentrated sulphuric acid and then distilling the mixture with aqueous vapor, or by oxidizing with fuming nitric acid and then removing the oxidized portion with hot water, thus leaving the unaffected petroleum behind.

DETERMINATION OF PHYSICAL PROPERTIES.

The *specific gravity* is one of the best known properties of oils and is the one most generally applied because it is readily determined. The specific gravity is a very important factor, but is readily tampered with, consequently very careful deductions based on it must be made.

Solubility.—Very definite and satisfactory data have been established for many oils relative to their solubility; so much so that this physical property is probably more reliable than any other single one. The common adulterants are generally revealed by the application of this test. The volatile oils are quite readily soluble in alcohol, ether, acetone, acetic ether, glacial acetic acid, carbon disulphide, chloroform, benzol, petroleum ether and paraffin oil.

The *optical rotation* is exceedingly valuable, frequently being the only means by which the purity of an oil can be arrived at, and should never be omitted.

Fractional distillation is usually resorted to in cases of admixture.

The *congealing point* is especially useful and necessary with anise oils.

QUANTITATIVE ESTIMATION OF CONSTITUENTS.

Before an oil can be submitted to a chemical examination, it is necessary to know at least its chief constituents, and then the methods must be so adjusted that these constituents can be estimated quantitatively with a considerable degree of accuracy. Such methods have been elaborated only within recent times, and are based on well-known organic reactions.

The oldest and probably the most useful is the method of *ester determination* or *saponification.* It was originally applied to essential oils as we now apply it to fixed oils, and is based on the fact that fixed alkalies resolve the esters into their respective alcohols and acids, the alkalies combining quantitatively with the latter. Then, knowing the ester in a given oil, the amount can readily be calculated by the quantity of alkali consumed by a given weight of oil. The linalyl acetate of lavender and bergamot oils is readily estimated by this process.

Aldehydes.—In the case of aldehyde-bearing oils, as cassia, the property of sodium bisulphite forming a compound soluble in water, containing an excess of sodium bisulphite, is utilized. This process is of much practical value with oil of cassia, and the oil is now generally purchased on the basis of aldehyde content.

Acetylization.—Many of the oils contain alcohols as essential constituents. These can mostly be estimated by converting them into acetic esters, by means of acetic anhydride, removing water-soluble products by washing with water, then dehydrating the residue by means of fused sodium sulphate, and estimating the amount of acetyl group contained in a given weight of the acetylized oil.

PHENOL DETERMINATION.

It is the custom in France to rectify oil of thyme with considerable quantities of turpentine oil. The original cause of this procedure is probably due to the fact that the consumer requests a colorless oil, and oil of thyme contains a goodly per cent. of phenol

bodies, which cause the freshly distilled oil to develop a coloration in a short time. The smaller the amount of phenol, the longer the oil will remain colorless. Careful analyses of this oil show that a pure product contains about 25 per cent. of phenols, and these can be approximately estimated by treating a given volume of oil with a 5 per cent. solution of sodium hydroxide, in a burette, and noting the diminution of volume of the oil. The alkaline solution forms soluble compounds with the phenols.

The following comprises a list of oils and the impurities found in them by various observers, as well as the writers:

Almonds, bitter, true.—There are no objections, so far as the writers know, to the preparation of a so-called oil of bitter almonds made from apricot or peach kernels, but it ought not to be offered as the genuine article. The true oil is often adulterated with alcohol, nitrobenzol, turpentine and benzaldehyde, the latter sometimes *in toto.*

Aniseed, spermaceti up to 35 per cent., alcohol as much as 80 per cent., kerosene, wax, oils of fennel, cedar, copaiba, camphor, turpentine, fennel stearoptene and oil of caraway, obtained from both the seed and the chaff.

Angelica, copaiba.

Amber, crude, resin mixed with coal oil and turpentine. It is rumored that crude petroleum is frequently supplied for this article.

Amber, rectified, resin oil, turpentine and kerosene. Note remarks made under amber, crude.

Bay, cloves, pimento, turpentine and oils containing phenols. It has also been adulterated with redistilled oil of cinnamon leaf, with a slight admixture of redistilled oil of lemongrass. Such an article has been pronounced by those of little experience superior to the pure product, appearing sweeter, more aromatic and not as heavy in odor as a pure oil.

Birch, methyl salicylate, and there is no absolute method to detect it.

Bergamot, lemon, orange, French turpentine, linaloe, fatty oils.

Cajeput; this is often *looted.* A mixture of rosemary or savin with camphor and resin of milfoil is often substituted. Oils of camphor and turpentine must be looked for.

Cajeput, Formosa, said to be a mixture of cajeput and oil of camphor.

Camphor, benzine, coal oil, turpentine, one case 25 per cent.

Canada snakeroot, copaiba.

Cananga, coca nut oil.

Cassia, coal oil, fatty oils, resin (one case 18 per cent.), oil gurjun balsam, cloves, cinnamon leaf, cedarwood. A 90 per cent. aldehyde containing oil of cassia reduced to a 70 per cent. strength oil, by the addition of enough coal oil. A large profit in coal oil.

Caraway seed, often a looted oil; turpentine, oil of caraway chaff and added limonen. The term "twice rectified" for this article is rather misleading, as each rectification reduces the percentage of carvol. The single distillation of Dutch caraway seed produces a superior oil and of much greater strength than the so-called "twice rectified."

Cedrat, a mixture of orange and bergamot.

Cedar, hemlock, spruce, turpentine, oil of camphor.

Cedar leaf, cedarwood, thuja.

Celery seed, celery leaf, turpentine.

Chamomile, cedar, copaiba, turpentine, milfoil, lemon. The manufacturer sometimes distils lemon or turpentine over his chamomile flowers.

Cinnamon, cloves, cassia.

Citronella, Japanese oil of camphor, the light variety. This article was preferred by some, as it had a sweeter odor. Fatty oils, oil of gurjun, coal oil, coca nut oil. A controversy occurred in England as to whether a mixture of citronella 35 per cent., lemon 10 per cent. and coal oil 55 per cent. could pass as citronella oil.

Coriander, orange, cubebs, cedar, turpentine. Oil of orange distilled with coriander.

Copaiba, oil gurjun balsam.

Cloves, clove stems, fatty oils, copaiba, pimento, coal oil, turpentine and carbolic acid. A looted oil is sometimes met with.

Cubebs, copaiba.

Curaçoa orange, bitter orange and bergamot.

Dill, caraway chaff oil, mace, turpentine.

Eucalyptus, looted oil, cheaper grades of eucalyptus. Turpentine is said to smooth a rough oil.

Fennel seed, looted oil, fennel chaff, alcohol, oils containing phenols.

Geranium, gingergrass, rectified citronella, fatty oils.

Geranium, Turkish, fixed oils, turpentine, coal oil.

Gingergrass oil, mineral oil and turpentine.

Hemlock, spruce, turpentine.

Juniper wood, turpentine.

Lavender, garden, spike, oil of camphor, turpentine.

Lavender flowers, turpentine, alcohol. A poor oil is sometimes found "plugged" with ester. According to Schimmel, the test for solubility, one part to three of 70 per cent. alcohol, does not prove or disprove the presence of turpentine. The method of distillation is responsible in the majority of cases for the variations in specific gravity, optical rotation and solubility.

Lemon, poor lemon oil, with citral from lemongrass added, poor or old orange oil, turpentine. When testing on paper, use a piece of fresh lemon peel for comparison.

Lemongrass, fixed oils.

Limes, expressed, lemon.

Melissa, lemon, citronella or lemongrass distilled over melissa leaves. Mixtures of lemon and citronella or lemongrass.

Matico, alcohol, turpentine.

Mace, distilled, poor quality nutmeg oil.

Neroli, petit-grain, with a little bergamot, improves the quality of a poor oil. Lemon or orange increase optical rotation. Petit-grain or linaloe decrease optical rotation.

Orange, alcohol, turpentine. When testing on paper, use orange peel for comparison.

Origanum, a mixture of thyme, oil of camphor, turpentine and coloring matter; crude oil of sassafras, rectified resin oil, Barbadoes tar, crude petroleum.

Palmarosa, coca nut oil, petroleum.

Patchouli, cedarwood, cubebs, turpentine, coal oil.

Peppermint, mixture (peppermint, glycerin, alcohol and turpentine) copaiba, erigeron, turpentine, castor oil, pennyroyal, alcohol, glycerin, oil of camphor, sassafras, looted oil.

Pennyroyal, de-mentholized mint, turpentine, alcohol, residue from peppermint distillation.

Petit-grain, turpentine.

Pimento, cloves, carbolic acid.

Pine-needle oil, turpentine. Much confusion exists in these oils, due partly to the nomenclature of the coniferæ.

Pinus Sylvestris, Scotch oil of fir, coal oil, turpentine. Very little genuine is to be had.

Rose.—The leaves of rosa alba added to the Bulgarian rose, as the oil from this mixture contains more stearoptene, so that the distiller is able to add more geranium oil without reducing the melting point below the minimum. Indian geranium or ginger-grass, palmarosa, true oil of rhodium, light paraffin oils, fixed oils, guaiac wood oil, alcohol, spermaceti, paraffin. This is the record breaker for number of adulterations.

Rhodium, a mixture of rose and copaiba.

Rosemary, camphor and lavender, turpentine, spike oil, petroleum oil, alcohol, rectified camphor oil.

Rue, turpentine, coal oil.

Sandal, "German," mixture of sandal-English and copaiba.

Sandal, "East India" or "English," castor oil, copaiba, fatty oils, cedarwood, oil of gurjun, West India sandals. Chloroform and alcohol were found in one sample that is said to have answered the U.S.P. requirements. This oil should be from one to two years old, as ageing considerably improves the fineness of the aroma. The U.S.P. requires a specific gravity 0·970 to 0·978. Ten observers, including Schimmel, Umney, Parry, Bush and Squires, average 0·971 to 0·979. Optical rotation, — 12° to — 20°; santalol, from 86 to 98 per cent.

A safe average for a good oil would be, optical rotation, from — 17° to — 19°; specific gravity, 0·975 at 15° C.; and santalol at least 90 per cent. A lot of oil made by a certain firm had a specific gravity of 0·9767; optical rotation, — 17·5°; contained 97·16 per cent. of santalol, and was freely soluble in five volumes of 70 per cent. alcohol.

Savin, juniper, turpentine. Mr. Dohme found 80 per cent. of turpentine in one sample.

Sassafras, safrol, coal oil, oil of camphor.

Spearmint, turpentine.

Spruce, turpentine.

Tansy, spruce, turpentine.

Thuja, cedar, pine leaf, turpentine.

Thyme, camphor, turpentine. A recent examination showed that a pure article can be obtained, but generally it runs very low in phenol content.

Verbena, lemongrass.

Vetivert, fixed oils.

Wine, light oil, fusel oil and the distillate obtained from the residue left in the manufacture of ether.

Wormwood, turpentine. Residue from the distillation of oil of tansy. A mixture was once sold as oil of wormwood which cost about 65 cents per pound to make. It consisted of oils of cedar, spruce, amber, tansy refuse, alcohol and turpentine. One of the authors had a sample of this unique compound shown him. Even a hasty examination should have disclosed most of the ingredients.

Wintergreen, true.—There is practically little of this oil to be had. Birch, pure methyl salicylate and mixtures of the two are often sold for it. When it was a common commercial article, Japanese oil of camphor, other light oils, coal oil, sassafras and chloroform were the chief adulterants. There appears to be no satisfactory test to identify an admixture of methyl salicylate and birch except optical rotation, and this observation must be made with extreme care.

Ylang Ylang (Flower of Flowers), kananga, fatty oils, synthetic oil.

In conclusion, the writers would state that they make little claim for originality. This paper contains the results of some years of observation and information supplied by friends. Existing literature was largely drawn upon, chief among which were "Die Aetherische Oele," von E. Gildermeister und Fr. Hoffmann; the English translation of this by Edward Kremers; "The Chemistry of Essential Oils and Artificial Perfumes," by Ernest J. Parry; "Odorographia," by J. Ch. Sawer, and the "Semi-Annual Reports of Schimmel & Co."

DRUG CULTURE.

By F. B. Kilmer.

I have heretofore urged attention to the study of medicinal plants at their source of supply, both in their natural habitat and under cultivation.

In one instance I pleaded for the publication of specific information as to the propagation, growth, collection and preparation of medicinal plants, having in view the highest conservation of their medicinal constituents, and of securing more uniform production,

and especially the issuance, either by the Government or otherwise, of bulletins containing information as to the best modes of cultivating, collecting and preparing such medicinal plants as are suited to the climates of our States and territories.[1]

That these appeals have not passed unheeded is evident from the interest now manifested in the subject of drug culture.

The object of the present communication is to stimulate, and, if possible, add a few practical notes to the somewhat meagre literature on this subject. In the consideration of the cultivation of medicinal plants several points present themselves:

It is stated that the time is not far distant when we will be dependent upon the agriculturist for our medicinal plants; that the destruction of wooded lands and other causes are lessening the supply of drug-yielding plants, and that drug farms will soon be a necessity.

Scientific agriculture has taught the grower how to develop given products of plant life force. If, by scientific cultivation, we can augment or regulate the important active principles of drug plants, there is hope for an economic and scientific recompense.

After a somewhat careful review of the situation it is evident to me that the problem in the cultivation of medicinal plants can best be solved by the American pharmacist.

In this country we can call to our aid resources of a most extensive and varied soil and climate, and scientific agriculture here reaches the highest attainable point. From the beginning we shall have the advantages of American machinery and methods as against peasant labor, which now supplies the bulk of the European products. But of striking importance to pharmacy and medicine is the fact that intelligent drug culture will tend to throw light upon the problem as to the relative value and activity of drugs gathered in a wild state, as compared with those under culture.

Heretofore cultivation has not been necessary or expedient for many drug plants. Our knowledge of the influence of cultivation upon their medicinal and active principles is, therefore, very meagre.

In respect to narcotic drugs, the statement that those which grow wild contain the greater proportion of alkaloids is generally accepted

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[1] "In Lands Where Drugs Grow." AMERICAN JOURNAL OF PHARMACY, April, 1900.

as true, yet I have seen specimens of cultivated belladonna root which would assay over 1 per cent. alkaloids. We are also confronted by the fact that under industrial stimulus cultivation has had the effect of increasing the alkaloidal yield in cinchona, poppy, coca, the caffeine-bearing plants, tobacco, etc.

On one hand the possibility of a scarcity of certain drugs and the probability of the betterment of our vegetable materia medica would seem to be questions of great importance to pharmacy, and would seem to answer the first and most natural query: Will it pay?

The following notes here are given with a view to stimulate further study rather than as having any practical value.

It is quite apparent that the conditions which influence the growth of plants and agricultural products in general will apply more or less to the cultivation of drug plants.

The controlling influences of climate (heat, light and moisture) upon plant growth are well known. To a certain extent climatic conditions are more than soil. The influence of climate upon the medicinal principles of plants is undeniable, but in this respect we have no accurate data upon which to form conclusions.

Numerous alkaloidal drugs at the present time are grown in Great Britain and Western Europe. Here we have cool summers (in England considerable humidity) and a gradual approach of cold weather. Maturity is late and indefinite. Under these conditions we find that certain plants are rich in alkaloids.

These same plants, if transplanted to America, would probably be killed by the fall frosts before maturity, and after a few generations they would acquire the quick-ripening habits which are characteristic of our vegetation. Would the alkaloidal yield follow this change of growth?[1]

Temperature is seemingly not the all-important factor influencing the alkaloidal yield. Some Northern-grown tobaccos are weak in nicotine and others are very rich. Kentucky tobacco is very high in alkaloid. Certain tropical-grown tobaccos are the weakest of all. Poppies have been grown in France yielding many times the amount of morphia of those grown in India. Indications point to humidity and rainfall as more potent than heat.

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[1] Atropa belladonna is quite at home in England, but I have seen thrifty specimens in the tropical gardens of the West Indies as well as in Northern New York.

In my observations upon the European narcotic drugs, the most thrifty specimens, rich in alkaloids, were found among the dense foliage of forests where the rays of the sun never reach the soil, and, as naturally would be expected, these same plants, when cultivated in narrow valleys with a northern or eastern aspect, were the most prolific in growth.

In considering the influence of climate upon drug culture we must also bear in mind that there are vertical as well as horizontal zones of vegetation, and we must therefore expect that the growth of drug plants will follow the well-known range of trees, shrubs, vines, grasses, etc., in this respect.[1]

As to the soil best adapted to the growth of medicinal plants we know almost nothing. It will be necessary to study each plant by itself in this respect. Taking the European-grown drugs as types, it has seemed to me that those regions where the soil was a mixture of humus and calcareous earths were the most productive; soils rich in sand or clay produced the least.

In England aconite and henbane are cultivated in Kent on light sandy soils. They grow wild on marshy land. The soil in Lincolnshire, where drugs are cultivated, contains a good percentage of fine sand and vegetable matter and is not very high in lime.

In another section, where the same drugs are grown, the soil is a brown loam lying over a chalk formation, and contains 15 per cent. of lime. The vegetable matter from this soil is not very high. From the Continent a sample of soil on which lavender and several narcotic herbs are grown was reported to contain 35 per cent. vegetable matter, 51 per cent. of sand (quite fine), 10 per cent. of lime and 2 per cent. of phosphoric acid.

So far as I could learn the potash content in these soils was not high. Observing the conditions under which many medicinal plants thrive, we might conclude that rich soil was not a necessity.

In one of my experiments I selected a very poor red shale soil where grass would not grow, even under fertilization with compost, and on this soil the growth of rhubarb, digitalis, conium, cotton, aconite, etc., was a pronounced success.[2]

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[1] The writer is preparing a list of the common drug plants suited to the temperate zone of the United States with such information as can be gathered as to the zone of vertical cultivation, and will be pleased to receive aid and suggestions.

[2] An analysis of this red shale soil gave the following results :

In botanical gardens the drug plants in the richest beds generally look the least thrifty. It has been stated by experienced drug cultivators that the alkaloidal content of plants is lessened by high fertilization. This statement accords with such actual practices as have come under my notice. Against this statement we have reports of experiments made in the sewage gardens of Berlin and elsewhere which tend to show that fertilization with sewage gives an increase in the alkaloidal yield.

In plants which yield aromatic principles high fertilization is conceded to be beneficial.

I am inclined to the opinion that fresh manure is prejudicial, and that compost, especially that from rotted leaves, straw, etc., is the best. We seem to have no information respecting the use of artificial fertilizers upon drug plants.

It is probably unnecessary to urge the selection of good seeds. It will be found advisable to obtain seeds from plants grown in the same geographical region, or especially in the region representing as nearly as possible the same climatic conditions as our own. My experience has shown that from some cause but a small proportion of the seeds of medicinal plants germinate. (In some of my experiments only 25 per cent. of selected seeds were fertile.) Every farmer sows from five to twenty times more seed than he needs, and of the seeds which germinate, it is estimated that not more than 10 per cent. give mature plants.

For the present the source of seed supply for medicinal plants not indigenous to our country must be such as can be obtained from wholesale druggists. These will often prove unreliable. The processes of drying, age and other influences to which they have been subjected are not conducive to growth.

It is to be hoped that our seedsmen and botanical gardens will in

Silicic acid and quartz	73·00
Peroxide of iron	10·00
Alumina	3·20
Lime	4·93
Magnesia	0·90
Potash	0·73
Soda	0·97
Sulphuric acid	trace
Carbonic acid	
Water	1·00

time become reliable sources of supply. For indigenous plants the wild plants themselves will furnish the seed required.

The effects of cultivation upon medicinal plants, while of deep significance, are beyond the scope of this paper. The words of Darwin should be kept in mind: "Changes of any kind in the conditions of life, even extremely slight changes, often suffice to cause variability." Changes of food, climate, changes of any of the conditions of environment, have a modifying effect upon colors, proportions, details of structure, etc.

Under cultivation, the growth of tubers, roots, stalks, leaves, etc., changes. Thus it may be expected that the plant functions from which arise the odorous, alkaloidal or other active principles will also vary between wild and cultivated plants. As to the nature and extent of the effects of cultivation upon the production of these medicinal principles, we have no tangible knowledge. My impression is that in our first attempts we shall do too much cultivation.

The most virile drug plants that we know are for the most part wild. They live a savage life. Their vital force is the accumulation of ages of struggle in the winds and storms of the wilderness; rooted in the black mold rich in the decay of countless preceding generations, a change from barbarism to civilization, from the forest to the conservatory, must cause a marked reaction.

Weeds are always stronger than the cultivated plant. Thus it seems to me that when we bring wild medicinal plants from another country to our own, we had best plant them out in the fields under as nearly as possible the same surroundings as were experienced in their habitat. In other words, let them grow as weeds. It may be that in this way we can utilize some of our fallow lands and waste ground.

Every pharmacist can do his part to help along the cause of drug culture. The Michigan University, with a few acres, and Frederick T. Gordon, with a garden bed, have given us helpful examples.

Every college of pharmacy should have a college farm. Through the aid of this farm and the college laboratory the question of soil, climate and fertilization, as well as other influences upon the plant constituents, can be studied.

In England many country chemists, and on the Continent the rural *Apotheker*, give considerable attention to, and derive a profitable income from, the cultivation and gathering of medicinal plants.

Some of these have achieved quite an enviable reputation for preparations made from plants of their own culture.

Could not American pharmacists in the rural districts take up drug culture, and might it not be a notable feature to be able to advertise: "Rhubard, ipecac and jalap fresh from our own drug farm?"

Pharmacists can invoke the assistance of agricultural experiment stations. Many of these institutions can and will carry out experiments and give reports which from a horticultural standpoint will be of value.

Cultivation of good-sized plots in a variety of locations with records of soil, climate and results, while it may not prove immediately remunerative, will furnish a vast amount of information and interest. Wholesale druggists can materially assist by supplying seeds which are authentic and reliable.

As an easy and instructive experiment for the beginner, I suggest the cultivation of certain alkaloidal plants which are indigenous (stramonium, hydrastis, etc.), with a view of obtaining records of assay of wild and cultivated drugs grown in the same locality.

In a succeeding communication I shall bring together notes of methods followed in the cultivation of certain medicinal plants which have come under my observation.

THE DISCOLORATION OF SYRUP OF IODIDE OF IRON.

By F. W. Haussmann.

The causes of the color change in syrup of ferrous iodide have frequently been investigated, and the published statements resulting from these researches cannot be regarded as conclusive.

Chemical decomposition of the ferrous iodide, indicated by the liberation of iodine, or the formation of ferric compounds, furnish the basis upon which the majority of investigators agree. A consideration of the process of preparation, involving the several steps, especially the common mistake of the tyro to filter the iron solution while yet brown, will readily explain the universal acceptance of such statements.

It has, however, been observed by many pharmacists that the syrup, despite the efforts at preservation by following a number of

contradictory suggestions, such as exposure to direct sunlight on one hand and entire exclusion of light on the other, gradually turns darker.

The fact that application of the starch test gave negative evidence of the presence of free iodine indicated the necessity of another explanation.

This was believed to be found by advancing the theory that a ferric compound is formed, and the statement that ferrous iodide changed to ferric iodide or oxyiodide was accepted as conclusive.

This change probably takes place if an aqueous solution of ferrous iodide is evaporated with the view of obtaining the salt, but, based upon results obtained from the examination of a number of specimens of various age and shade of color, the writer questions if this takes place in the syrup.

In an examination of some fifteen discolored samples not one reacted for the presence of ferric compounds.

This result practically excludes this theory, and the cause of discoloration must be sought elsewhere.

Recently the action of free acids upon syrups has received attention, and the changes produced thereby have been described. Considerable work still remains to be done in this direction, and the action of metallic salts, in particular those of an acid reaction, upon saccharine solutions demands exhaustive investigation.

Regarding the reaction of ferrous iodide, the statements of the Pharmacopœia are contradictory, the saccharated iodide being stated to have a slightly acid and the syrup a neutral reaction. Founded on the results of an investigation carried on for some time, the writer inclines to the belief that the action of the iron salt, without itself undergoing any chemical change, causes discoloration of the syrup.

The amount of heat employed in preparing the syrup also has an important influence.

The following reasons may serve to substantiate these assertions:

Ferrous iodide is not the only iron salt which, with the influence of heat, causes darkening in syrup.

A syrup of ferrous sulphate, containing 10 per cent. of the salt, prepared by dissolving sugar in an aqueous solution and heating to boiling, on standing from 4 to 6 months with exposure to light, turned from a light green to a brown color.

Examination at the expiration of six months, with the view of

determining the possible formation of a ferric compound, gave a negative result.

Identical results were obtained with a syrup containing 10 per cent. of ferrous chloride.

The influence of temperature is demonstrated by the fact that syrups prepared by dissolving the sugar in the iron solution at a temperature below the boiling point, possess greater stability than those heated to boiling.

The addition of hypophosphorous or other acids exerts no influence except to prevent the liberation of iodine.

Several specimens of the syrup to which hypophosphorous acid was added, originally of a bright green color, have gradually turned brown.

The premature addition of an acid may cause the syrup to rapidly change in color.

In an instance, where this possibility was considered, the addition of hypophosphorous acid to a boiling bright green syrup was followed by an immediate change to dark brown.

This points to the necessity of adding the acid only to the perfectly cold syrup.

This color change may also be noticed if a small quantity of the syrup, either with or without an addition of acid, be heated to boiling and the heat continued. Caramelization will be the consequence.

Brief mention may be made of the restoration of discolored syrups of iodide of iron.

Specimens containing free iodine may be restored by the well-known practice of digestion with iron filings.

Care in the regulation of heat must be observed, and addition of a sufficient amount of water to restore the original weight of the syrup should not be neglected.

A syrup, in which the brown color is due to caramelization, is difficult of restoration.

Animal charcoal will remove some of the brown color, but the writer has never been able to completely restore the original bright green color by this method.

It may incidentally be mentioned, that if further investigations should prove this action of iron salts upon saccharine solutions to be true, the color change in elixirs containing scaled iron salts, which is the source of much annoyance to the pharmacist, is thereby explained.

PHARMACISTS' APPARATUS STAND.

By J. Percy Remington, B.S.

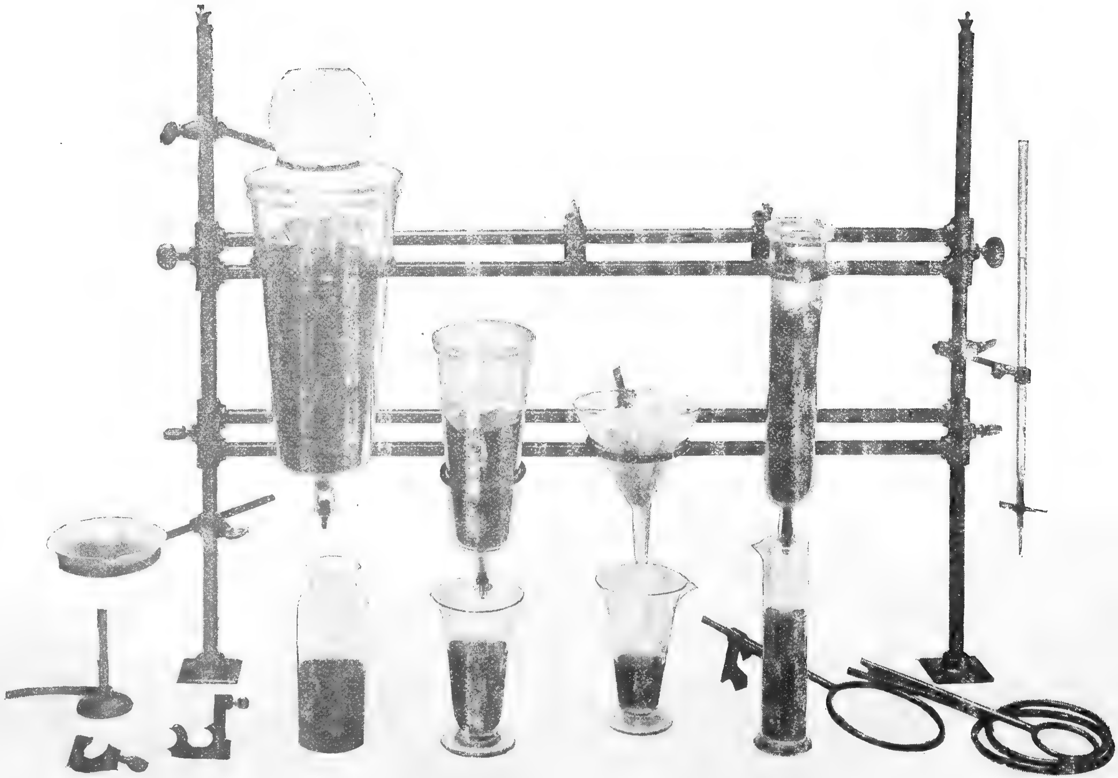
A stand adapted for supporting all kinds of apparatus used in the daily work of the store and laboratory has been a desideratum for many years.

The busy pharmacist has to perform every day many operations that require the use of apparatus of various size and shape. Percolation, filtration, evaporation, distillation and testing all require the use of such vessels, and the problem of devising a stand for holding these firmly, and in the proper position, is one of far-reaching importance.

How often has the pharmacist, harassed by a multitude of exacting duties and interruptions, started an operation, and after carefully selecting the materials and setting up the apparatus, had the flimsy stand upon which he was depending break down and upset the vessel, thus losing time, patience, apparatus, results and possibly a suit of clothes. Or it may be that after several operations have been started and are under way an emergency arises and a sudden call forces the operator to start another filtration; he finds that his single retort stand is crowded to its full capacity, and he looks despairingly at the limited counter space at his disposal, which he dare not encroach upon.

The ordinary ring stand has been, so far, the only means of supplying support for the various pieces of apparatus in constant use by the pharmacist. For a long time it has been evident that a new device, which would satisfy all the various needs, is an actual necessity. These ring stands are constructed of a rod screwed into an iron base, the ring clamps being secured to the upright rod by thumbscrews. They are not made strong enough to stand the weight which is often put upon them, the number of positions in which the rings can be placed is very limited, and they do not vary sufficiently in size to be of equal value for the needs of all stores.

The points which must be taken into consideration in devising something which will fulfil all the requirements are: That the apparatus shall be sufficiently strong to support a heavy weight likely to be put upon it; that it may be so adjustable that the rings may be put in any position necessary; that it may be compact enough to occupy very little space (and this to be the least valu-



Pharmacists' Apparatus Stand.

able); that it may be so constructed that it may be made of any dimensions to fit the space available; and that it may be enlarged or diminished in size, to suit the needs of the business.

The stand which is here described is the result of an effort to supply all these requirements. It is constructed of two upright tubes of heavy iron, secured firmly at the bottom by counter plates. Two parallel, horizontal, double tubes are arranged so as to slide up and down these upright tubes, and made secure by means of thumbscrews at each end. This completes the framework of the stand. The ring clamps, instead of being all in one piece, as in the ordinary stands, are made in two parts, the clamp composing one part, and the rings, with 12-inch shanks, the other part. The shanks of the rings are passed through two openings in the clamps, and are made secure by thumbscrews. The clamps are of two kinds, those which slide horizontally on the double tubes, and those which slide vertically on the upright tubes. The shafts of the rings are all of the same size, so that they can be used with either form of clamp, the rings varying in diameter from 3 inches to 7 inches.

All the thumbscrews are of brass, so as to prevent the possibility of rusting, and the castings are of malleable iron, so that the chance of breakage is very slight. The framework, being all composed of heavy iron tubing, is sufficiently strong and firm to uphold any weight which would be likely to be put upon it, and every part is constructed with a view to withstand hard usage.

It will be readily seen that the adjustability of this apparatus stand is complete. It is possible to get any desired position of the rings in the three dimensions of space, upward or downward, right or left, backward or forward.

The space which it occupies when not in use and the rings removed is very small. The frame stands on the counter 4 inches from the wall, thus taking up the room which is least valuable, and leaving all the front part of the counter available for other purposes. As the amount of space varies considerably in different stores, the advantage which this stand possesses in being made of iron tubing which can be cut in any length to suit the space available, and the fact that it can be screwed to the counter or to the wall, or suspended from a shelf or the ceiling, will commend it to the practical and busy pharmacist.

THE ASSAY OF BELLADONNA ROOT AND ITS SOLID EXTRACT.

By Arthur Wayne Clark, B.S.

Having occasion constantly to handle samples of large quantities of the root of Atropa Belladonna used in preparing solid extract for use in belladonna plasters, the writer has had some experience with about all the standard methods of assay, and while little that is new is herein described, yet the method of procedure is given in detail, believing this attention to minutia to be a necessity to success and lack of such information the chief difficulty in working out a rational method for one's own constant use.

In favor of the method here described, it can be said that it is quite accurate, and yet can be carried out with a relatively short amount of time actually given to the work.

The method of extraction used is hot extraction with a reflux condenser, and while this and the other parts of the process require about twelve consecutive hours for the completion of one assay, still the total time given to the work need not exceed three or four hours, and during the shaking-out process the work can be left for any length of time necessary; in fact the longer the better. Besides this, duplicate assays can readily be managed at the same time, thus effecting a considerable saving of labor.

The objection is sometimes made to hot extraction of belladonna root, that there is a possibility of loss of alkaloid from the heat applied, but the writer could never see the force of this argument, for practically all the methods ever proposed finish by evaporating down the alkaloidal solution in chloroform or ether, thus applying the very heating process objected to above.

The fact that the mixed menstruum boils at 65° C. would seem also to make it impossible that there should be any loss from this source.

The advantages of hot reflux extraction are that it can be carried out much more quickly than a cold percolation, is more economical of menstruum, an important factor where a large number of assays is constantly being performed for commercial purposes, and it requires no attention whatever after the heat is once regulated, provided, of course, there is sufficient water-bath capacity to run for the required time.

More important than all these considerations is the fact that, on account of the concentrated character of the menstruum used, there is very little inert resinous matter carried through, and consequently the shaking-out part of the assay is free from this serious complication, always present in assaying an ordinary extract. Presumably, because of this feature, emulsification of the alkaline solution is quite infrequent instead of being the rule, as in assaying an extract.

METHOD OF PROCEDURE.

Weigh out in a tared beaker about 20 grammes of the root ground moderately fine. It is not necessary to weigh closer than the third decimal place in grammes, as an error of ·001 gramme here is not appreciable in the percentage result. Pour the weighed contents of the beaker carefully into a clean, smooth porcelain dish, of 18 or 20 centimetres diameter, tapping the beaker to shake out as much of the root as possible.

The menstruum used is that advised by Dunstan and Ranson, and is manipulated as follows: Mix up 60 c.c. or 70 c.c. of equal parts by volume of absolute alcohol and chloroform, and take about one-quarter of the mixture to moisten the root in the porcelain dish. Pour this portion of the alcohol-chloroform mixture first, into the tared beaker, whirling it around to collect the fine particles of root which adhered to the glass, then pour it into the dish and mix up well with a clean spatula until the root is evenly moistened.

Now take the inside glass cup of the reflux extractor, which should be about 1 inch in diameter and 3 inches deep, put in the bottom an absorbent cotton plug moistened with the alcohol-chloroform mixture and, holding the cup over the dish so as to catch in the latter any that falls, carefully transfer with a spatula a little root at a time into the cup, packing it in gently with a large, smoothly-rounded glass rod, finally shaking off any particles of root adhering to the rod and spatula.

Prepare a small wad of absorbent cotton for the top of the packed root, moisten it with some of the mixture and use one side of it as a mop to take up the last particles of the moistened root from the porcelain dish, spatula and rod.

Now place this cotton on top of the root packed in the glass cup, putting the side downwards that was used as a mop.

On top of the whole place sufficient clean lead shot to cover it and to hold it down.

Now set up the reflux condenser, add the rest of the 60 c.c. or 70 c.c. alcohol-chloroform and heat on a water-bath, extracting for seven hours. Presuming the rate of percolation to be 60 or 70 drops per minute, there will pass through the 20 grammes root about 1,500 c.c. of the hot menstruum or about seventy-five times its weight, a much larger proportion than is ever used in a slow cold extraction.

The above-described method of moistening and packing (the granulated root) is sufficiently accurate if reasonable care is exercised in carrying it out.

The percolate containing the alkaloid is now transferred to a separatory funnel and the alkaloid dissolved out by shaking with 20 c.c. dilute H_2SO_4 (½ per cent.).

Sometimes the fluids seem to mix and there is no separation or line of demarcation. If this is the case, add 10 c.c. or 15 c.c. water, shake again and the chloroform layer will be precipitated on standing about a minute, leaving eventually a clean-cut line between the liquids.

Since the chloroform solution separates as a bottom stratum, it must be drawn off first into a clean beaker, after which the acid solution is run out, well drained and put aside and the chloroform solution returned to the separator.

The chloroform solution is then shaken again with 15 c.c. dilute acid, separated in the same way and shaken again with 10 c.c. of the dilute acid. Quite frequently it will be found that the third shaking out will cause emulsification of the two liquids. If this happens it can be instantly remedied by adding 10 c.c. or 15 c.c. more of the original mixture of alcohol and chloroform in equal volumes and shaking up again after adding it.

There is no use in carefully washing out the stem of the funnel, etc., between each of these operations, as the minute quantity of solution adhering to it is simply carried over and is again separated in a much diluted condition next time.

There is usually a small quantity of flocculent precipitate and dirt collected at the line of separation in these acid extractions, and wherever such occurs to any appreciable extent, the dirt should be run out with the chloroform stratum, bringing the clean edge of the acid layer down to the bottom of the opening in the stop-cock. Sometimes a minute amount of the acid solution has to be allowed to go through with the dirt, but this again will be diluted and

reseparated next time, so that the loss will not be appreciated if the operation is carried out with care.

If in the third separation there is so much dirt present that there is danger of a very incomplete separation, then it is well to make a fourth extraction, using 10 c.c. acid again, but three extractions are usually amply sufficient.

This procedure leaves the acid solutions clear of insoluble matter, and thereby the alkaline extraction next carried out will be uncomplicated by its presence.

The three mixed acid solutions are now put into a clean separator, 20 c.c. 10 per cent. ammonia and 20 c.c. chloroform added, the whole violently shaken for several minutes and then allowed to stand.

The chloroform layer should fall down in five or ten minutes, leaving a clean-cut line between the two strata. The chloroform solution is then drawn off and set aside and the extraction repeated with 15 c.c. and again with 10 c.c. chloroform. Twirling and rocking the separator will greatly assist the rapid separation of the two liquids and sometimes the separation takes place almost instantly.

Sometimes an emulsion is formed and great difficulty is experienced in causing a separation, in which case an easy remedy is at hand in the very valuable suggestion of Moerk (AM. JOUR. PHAR., March, 1899), to put a few small flakes of stearic acid in the separator and shake up violently again. It is remarkable to witness the immediate separation of the two fluids, and as Moerk has proved that the stearic acid does not influence the result, this method has been used many times with great satisfaction, more especially, however, in extract assays, as it is seldom needed in direct root assays made as above.

In these alkaline extractions any sediment that collects at the line of separation should not be drawn off, but must be left in the upper aqueous stratum, and, after the third extraction, washed by adding a small amount of chloroform and running it out without shaking, but leaving the dirt behind, the chloroform being added to the rest. Care must be taken to draw off only the clear solution. This also rinses out the stem and should not be omitted.

The chloroform solutions are now all filtered through absorbent cotton into an Ehrlenmeyer flask of about 300 c.c. capacity and evaporated on a water-bath to a brown varnish-like residue, finally

blowing air into the flask to remove all chloroform and to carry out any free ammonia which may be present. Now add about 10 c.c. chloroform, shake up and evaporate down again as before, to assist in driving off any ammonia. This residue is then titrated as directed later on. Ether should not be substituted here for chloroform, as the writer has found ether to be almost invariably acid, which being the case, it will ruin the result.

The water-bath should be heated by steam, as any open flame nearby will decompose the chloroform vapors to hydrochloric acid, filling the room with its fumes and possibly neutralizing some of the alkaloid in the flask. The operation can, however, be carried out over a bath heated by a flame, if there is a good ventilation to remove the vapors, and the contents of the flask are kept boiling hard.

In the shaking-out process the writer experienced considerable trouble with the spitting of the solutions from the mouth of the separator when the stopper was removed after shaking. The U.S.P. advises that the best way to control this in these separators is to shake the contents slightly before putting in the stopper, but this scheme was not at all successful in preventing the trouble, due probably to the warmth of the hand in shaking the very volatile contents of the separator. An easy solution of the difficulty, however, was found in putting the stopper in tightly, shaking up as usual and allowing to separate without relieving the pressure, and then, when ready to draw off, opening the outlet cock slightly and allowing the pressure to exert itself in gently blowing out the lower stratum through its natural outlet. After a few cubic centimètres have been expelled the pressure will have expended itself, the cock can be closed and the stopper removed without harm, after which the solution can be run off as usual.

As to the method of titrating the alkaloidal residue from the three mixed chloroform solutions, the writer finds that the best way is to dissolve the brown residue in about 5 c.c. neutral alcohol in the cold, then add about 100 c.c. distilled water and three drops of 1 per cent. alcoholic hæmatoxylin solution. This is then titrated at once with twentieth normal hydrochloric acid $\left(\frac{N}{20}\ HCl\right)$ to a pure yellow color, the neutral point being indicated by the *absence of any trace* of red.

With a little practice on alkaline solutions this point can usually be read to a drop, but it is well to note the neutral point and then run over it and titrate back with $\frac{N}{20}$ alkali to the first indication of any tint, thus confirming the former reading. The number of cubic centimetres acid used multiplied by ·0145, the $\frac{N}{20}$ factor for atropine, gives the weight of alkaloid present in the 20 grammes root.

It seems to have been the practice among some chemists to dissolve the alkaloidal residue in a measured excess of the standard acid and titrate back with alkali, but solution in alcohol is very much easier and quicker and also gives more accurate results, for the writer has found that the acid dissolves the thick gummy residue very slowly and leaves a quantity of flocculent insoluble matter floating in the solution, rendering a close color-observation practically impossible. By dissolving in alcohol this does not take place until an excess of the acid has been added and by that time the operation is finished.

The accuracy of this method compared to the direct acid solution was tested by taking a chloroform solution from an assay and dividing it in half, each half being evaporated down in a separate flask, one dissolved in $\frac{N}{20}$ HCl and the other in alcohol. The results were exactly alike, except that the correct neutral point was much more easily seen in the alcohol solution. The presence of the small amount of alcohol, therefore, has no influence on the result and its use is very beneficial both in regard to time and accuracy.

For some reason which has not been ascertained, the alkaloidal solution colcred with hæmatoxylin will sometimes turn a greenish or purplish color as the acid is added to it, but this apparently does not influence the result, as the point of disappearance of the color is as clearly defined as though the color were a clean red, the final yellow being the same as usual.

ASSAY OF THE SOLID EXTRACT.

The best method of procedure in assaying the solid extract has proved to be as follows:

Weigh out in a tared beaker 4 or 5 grammes extract and with a glass rod rub it up smooth with 10 c.c. or 15 c.c. ½ per cent. H_2SO_4,

pouring the mixture into a separator. Rinse out the beaker several times in the same way with smaller quantities of the dilute acid, transferring each portion to the separator. Now wash the acid mixture in the separator by shaking with 20 c.c. and again with 15 c.c. chloroform, running the chloroform out as waste. Take care to draw off only the clear solution. Next rinse this waste chloroform by shaking very gently in another separator with 10 c.c. dilute sulphuric acid, throwing away the chloroform and returning the acid to the rest of the acid washings in the first separator.

Neutralize the acid solution in the separator by adding 20 c.c. 10 per cent. ammonia and extract the alkaloid by shaking with 20 c.c., 15 c.c. and 10 c.c. chloroform exactly as in the root assay. There will be a very considerable quantity of brown flocculent material collected at the line of separation, floating in the chloroform and extending down through it so that sometimes only very little clear chloroform solution can be drawn off at first. As nothing must be removed but this clear solution, it will often require as much as an hour to complete each separation, although it can be done more quickly with some samples. The use of stearic acid is usually necessary in these separations, for in many cases emulsification is so complete that the liquids would never separate without its aid.

When separation begins the only way to work is to draw off the first clear part, bringing the floating material down to the top of the hole in the stop-cock; then by rocking, twirling and tapping, followed by several minutes' standing, the floating material will draw up or float to the top of the chloroform, packing together or solidifying so to speak, and leaving some more of the clear chloroform to be drawn off as before.

The same procedure is repeated generally five or six times with each separation until the bulk of the flocculent sediment is reduced in size as much as possible, after which the next portion of chloroform is added to the separator, shaken up and separated little by little in the same way.

After the third separation is done add about 10 c.c. chloroform and draw it off without shaking, adding it to the rest as before, this being done to dilute the small amount of alkaloid solution remaining in the separator, so that the loss will be inappreciable.

Shaking out the extract in this way consumes considerably more time than is the case with the assay of the root direct, due to the

presence of resinous matter and other inert materials. It can, however, be accomplished with extreme accuracy if the operator will work patiently with the alkaline extractions as directed.

These chloroform solutions of the alkaloid are now mixed, evaporated down and titrated exactly as described above in the assay of the root.

J. Ellwood Lee Company Laboratory.

NOTE ON BENZOINATED LARD.

By Melvin W. Bamford.

Having recently had considerable trouble with benzoinated lard made from commercial lard because of the impurities in it, the writer visited a pork-packing establishment in order to obtain some information on the subject, and while there secured a quantity of what is known to the trade as "Pure Leaf Lard," which really is the leaf fat as it is obtained from the hog.

From this fat there was made a quantity of lard by the process recommended by Professor Redwood, and adopted by the British Pharmacopœia. After removing as much of the membrane and tissue as possible, the fat is simply heated at a temperature not exceeding 150° F., and as the lard separates from the membrane, it is strained through flannel into another vessel. It will be noticed that there is no water used in the process, the advantage being that the lard thus made contains absolutely no water.

This lard was then benzoinated by the United States Pharmacopœial process, and the resultant product was found to be perfectly sweet and smooth, and to have an agreeable odor of vanilla.

The actual cost of the preparation, making an allowance of 10 per cent. for waste and 20 per cent. for labor, is about 12½ cents a pound. There are several makes of benzoinated lard on the market which are fully as good as this product; but the cost of these is from 20 to 25 cents a pound, so that the saving should be sufficient inducement to the pharmacist to make it himself. In addition to this, he will have the satisfaction of knowing that he has an absolutely pure preparation.

NOTE ON WARBURG'S TINCTURE.[1]

BY FERDINAND A. SIEKER.

The first and second editions of the National Formulary state that "each fluid ounce contains 10 grains of quinine sulfate."

The first edition of the National Formulary directs 1,280 grains of quinine sulfate in 8 pints of tincture, which is equivalent to 10 grains of quinine sulfate in each fluid ounce.

The second edition of this work directs 100 grammes (1,543·2 grains) of quinine sulfate in 5,000 c.c. (169·07 fluid ounces), which is equivalent to 9·131 grains of quinine sulfate in 1 fluid ounce, and not 10 grains as is intended.

The original formula for Warburg's tincture directed 10 ounces (Troy) of "quinia" for the amount of tincture resulting from 500 fluid ounces of proof spirit. If the yield is regarded as 480 fluid ounces, then 1 fluid ounce contains 10 grains of "quinia." Therefore, 10 grains in 1 fluid ounce may be regarded as correct.

The amount of quinine sulfate in my formula (AMER. JOUR. PHARM., Vol. 72, p. 573) is based on the quantity directed by the second edition of the National Formulary, which is not quite correct. My formula should therefore be corrected as follows:

Use 219 grammes of quinine sulfate instead of 200 grammes, and 24 grammes of sulfuric acid instead of 22 grammes.

The formula for the modified tincture (AMER. JOUR. PHARM., Vol. 72, p. 575) should therefore read: Use 73 grammes of each, cinchonine sulfate, cinchonidine sulfate and chinoidine pure, instead of 66·66 grammes.

The quantities of fibrous vegetable drugs, etc., given in my formula are also somewhat larger than directed by the National Formulary. The quantities are computed according to the original formula published in England, where in compounding the Troy ounce is used for solids and the fluid ounce for liquids.

LABORATORY OF LEHN & FINK, NEW YORK.

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[1] Refer to AMER. JOUR. PHARM., 1900, Vol. 72, pp. 571 to 575.

FORMULA FOR ELIXIR OF HEROIN AND TERPIN HYDRATE.[1]

BY T. B. McCLINTOCK.

Heroin	$5\frac{1}{3}$ gr.
Terpin hydrate	3 dr., 12 gr.
Spirit of bitter almond (5 per cent.)	10 m.
Compound spirit of orange	15 m.
Syrup of wild cherry	2 fl. oz.
Glycerin	11 fl. oz.
Alcohol, q. s.	1 O.

Powder the terpin hydrate and dissolve it in the glycerin by the careful application of heat. Dissolve the heroin in 2 fluid ounces of the alcohol, adding to the solution the spirit of bitter almond and the compound spirit of orange. When the solution of terpin hydrate has cooled, mix the two solutions and then add the syrup of wild cherry and sufficient alcohol to make 1 pint of the finished elixir.

RECENT LITERATURE RELATING TO PHARMACY.

MAGNALIUM.

This is a silver white alloy composed of aluminum and magnesium. It is not affected by air and water, and even withstands the oxygen acids to a great extent, but is attacked by alkalies. The specific gravity ranges from 2 to 2·2 at 15° C. It can be rolled into sheets and drawn into wire. The reflective power is very high, and it does not absorb the ultra-violet. These properties, together with its low density and high rigidity, make it a very superior material for specula.—*Brit. Jour. Phot.*, 1900, **47**, 2090.

L. F. KEBLER.

MANGANESE DIOXIDE IN BRAZIL.

The recently opened up mining district near Iterbira, Brazil, is producing a large quantity of very pure black oxide of manganese. This ore is apparently the remains of a manganiferous limestone from which the limestone has been removed. It is a hard metallic-looking ore, interstratified with about 20 per cent. of the hydrated manganese, which seems to contain the greater amount of the im-

[1]The above formula was received from the author and was recommended as having proven quite satisfactory in the hands of some of the physicians of his acquaintance.—ED.

purities. The dried (100° C.) material from a cargo will assay from 50 to 55 per cent. of metallic manganese. The moisture varies from 10 to 20 per cent. The quality seems to be the same deeper down in the mine. It is estimated that the amount of ore in sight on one property is 2,000,000 tons. The ore outcrops on hills; can be mined without motive power, and run directly into railway bins, without picking, by means of shoots.—H. K. Scott, Iron and Steel Inst., spring meeting, 1900. L. F. K.

CHEMICAL COMPOSITION OF SALA AMALGAM.

The oldest known natural silver amalgam is found at Sala, Sweden. Two distinct varieties have been analyzed, corresponding to the formula Ag_2Hg_3 and Ag_5Hg_6. The gold amalgams of Columbia and California correspond to the formula Au_2Hg_3. —H. Sjögren, from *Chem. Ztg. Rep.*, 1900, **24**, 151. L. F. K.

THE PROTEOLYTIC ENZYME OF GERMINATED BARLEY.

Whether germinated barley contains a proteolytic enzyme or not is a much mooted question. Eminent investigators have arrived at different results. The workers below, being dissatisfied with the present state of affairs, determined to remove the darkness if possible. A 10 per cent. solution of gelatine was treated with the substance under examination. The material was rendered antiseptic by means of thymol and the mixture kept in an incubator at 20° to 40° C. The gelatine solution was cooled from time to time to 5° C. and examined for the first appearance of liquefaction at this temperature. It was found that an enzyme capable of liquefying gelatine is certainly present in malt. The enzyme may be extracted by very dilute acetic acid or digestion with water at any temperature below 32° C. It is almost, if not quite, destroyed by mashing at 70° C.

The presence of acetic acid favors its growth, but liquefaction of gelatine is much more rapid if the extract is slightly alkaline. The enzyme appears to be of a trypsin nature. Only traces of the enzyme occur in the ungerminated barley, but the increase is marked when germination begins and continues until the seedling becomes green.—W. Windisch and B. Schellhorn, *Woch. für Brau.*, 1900, **23**, 334. L. F. K.

THE PRODUCTION OF CRYSTALS OF MERCURIC AND MERCUROUS IODIDE IN THE WET WAY.

By adding ethyl or methyl iodide (preferably the latter) to an aqueous solution of mercuric acetate or mercurous nitrate, then shaking and allowing the mixture to stand in the cold, there are slowly formed crystals of mercuric or mercurous iodide. The former are bright red transparent plates and the latter are bright yellow needles.—F. Bodroux, *Comp. rend.*, **130**, 1622.

L. F. K.

CERIC SULPHATES.

Two ceric sulphates exist, the one yellow in color and the other red. The former is of simple constitution, the latter of a complicated structure. By dissolving cerium hydroxide in concentrated sulphuric acid and evaporating the solution, then recrystallizing from water, the yellow sulphate is always obtained in the first crystals and the reddish-brown sulphate then generally comes down afterwards as large crystals. Careful analysis shows the yellow sulphate to have the formula $Ce(SO_4)_2,4H_2O$ and that the red salt is $Ce_2(SO_4)_3,2Ce(SO_4)_2,2H_2O$.

In the red salt the metal exists in both the trivalent and tetravalent forms in equal amounts. The yellow compound dissolves to a clear yellow solution in water, but the red salt is at once decomposed by water into insoluble basic compounds.—W. Muthmann and L. Stützel, *Ber. d. Chem. Gesel.*, **33**, 1763. L. F. K.

LITHIUM PEROXIDE.

On mixing hydrogen peroxide (what strength ?) with a 5 or 6 per cent. solution of lithium hydroxide, then adding an equal volume of absolute alcohol and allowing the whole to stand, beautiful colorless crystals are deposited, having the following formula: $Li_2O_2.H_2O_2.$-$3H_2O$. When placed into a vacuum with phosphorus pentoxide, these crystals gradually lose water and leave practically nothing but anhydrous lithium peroxide, Li_2O_2.—de Forcrand, *Comp. rend.*, **130**, 1465. L. F. K.

TO PREVENT THE INTOXICATING EFFECT OF ALCOHOL.

L. Meyer, Eng. Pat. No. 6453, Apr. 6, 1900.

This patent covers a preparation consisting of burnt powdered coffee bean and olive oil (neither of which is new), to be taken

either directly or in the form of capsules, pills (?), lozenges (?), etc. L. F. K.

GLYCERO-SODIUM BORATE.

This compound of the Russian Pharmacopœia has been shown to be a mixture of the tri- and tetra-glycero-sodium borate and not a true chemical compound. A less hygroscopic preparation can be produced as follows: Mix 120 grammes glycerin (sp. gr. 1·255) with 100 grammes of borax and heat until the glassy mass becomes thready. It is then partially cooled and rolled into sticks. This compound is tetra-glycero-sodium borate of the formula $(C_3H_5)_4$-$(H_2BO_3)_2(HNaBO_3)_2(OH)_6O$, is readily soluble in alcohol and water and melts at 153° to 154° C.—E. Schazki, *Chem. Ztg. Rep.*, 1900, **24**, 148. L. F. K.

CRYSTALLIZATION OF AMORPHOUS SUGAR.

The presence of crystals, acting as nuclei, is conducive to the crystallization of amorphous sugar. Alkali salts, which to a certain extent prevent the formation of invert sugar, induce crystallization, while the other organic salts do not exert this influence. Light assists crystallization, but invert sugar retards it, and the retardation is proportional to the amount of invert sugar present.—F. G. Wiechmann, *Bull. l'Assoc. des Chim. de Sucr. et de Dist.*, 1900, **17**, 745. L. F. K.

THE PREPARATION OF ETHYL AND METHYL ALCOHOLS FROM THE CORRESPONDING HYDROCARBONS.

A German patent has been taken out for the production of the above alcohols by the direct union of the corresponding hydrocarbons and oxygen. These gases are mixed with a quantity of oxygen or air insufficient for complete combustion and the mixture passed through a tube containing a red-hot catalytic mass. If platinum is employed as the catalytic agent, oxidation proceeds too far, and the result is fatty acids only. The less energetic catalytic agents, such as asbestos, pumice stone, the various forms of copper or certain mixtures of the above, are the most suitable.—From *J. Soc. Chem. Ind.*, **19**, 684. L. F. K.

EDITORIAL.[1]

THE SPECIALIST AND THE PHARMACOPŒIA.

In the *Pharmaceutical Journal* for May, 1900, p. 523, Mr. E. M. Holmes comments upon and takes exception to some of the statements in an editorial note on "Vegetable Drugs in the U.S.P.," which appeared in the AMERICAN JOURNAL OF PHARMACY, May, 1900, p. 236, and which was reprinted in the *Pharm. Jour.*, June 23, 1900, p. 669.

It may be well to state at the outset that the editor lays no claim to being considered a specialist, or an authority or critic on botanical nomenclature, or the subject of the origin of foreign drugs; and any statements which he may have made must, of necessity, have been based upon the authority of some one else.

In a previous editorial note (AMER. JOUR. PHARM., 1900, p. 138) the writer sanctioned the view of an American botanist[2] (*Proc. A. Ph. A.*, 1898, p. 242) that Engler and Prantl's "Pflanzenfamilien" should replace Bentham and Hooker's "Genera Plantarum" as our authority. It so happens that the statements to which Mr. Holmes takes exceptions are for the most part those which have received the sanction of the aforesaid authority, viz., Engler and Prantl, and which have been prepared by the numerous experts in systematic botany who have contributed to this monumental work. I present herewith the language used by these experts in their descriptions of certain of the drugs considered by me, as also the exact references, and a careful comparison with the editorial note referred to will show the origin of the information therein presented. The exact references were not given previously, as it was considered sufficient to merely mention the names of the experts who had contributed this information.

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[1] The substance of this editorial has already appeared in the *Pharm. Jour.*, July 21, 1900, p. 58, in a signed article. Since that time Mr. Holmes has written another article in reply for *Pharm. Jour.*, 1900, p. 443.

[2] After carefully comparing the merits of Bentham and Hooker's "Genera Plantarum" with Engler and Prantl's "Die naturlichen Pflanzenfamilien," the author says: "In view of the considerations above set forth, the writer has no hesitation in urging upon the Pharmacopœia Committee that they sustain their progressive record by adopting the authority of the modern work" [viz.: the work of Engler and Prantl.—H. K.].

MYRRH.

In the consideration of myrrh, H. Engler (in E. and P., III. Theil, 4. Abth., Bog. 16–18, p. 255) says:

"C. abyssinica (Berg), Engl., liefert wie durch Deflers und Professor Schweinfurth festgestellt ist, die echte Myrrhe, Myrrha oder Gummi Myrrhæ. *C. Schimperi* (Berg), Engl., enthält reichlich Balsam und würde gute Myrrhe liefern können; es ist auch nicht unwahrscheinlich, dass ein Teil der arabischen Myrrhe von dieser Art abstammt."

COPAIBA.

P. Taubert, in the consideration of the genus Copaiba in E. P., III. Theil, 3. Abth., Bog. 8–10, p. 131, says: "Die Mehrzahl der amerikanischen Arten liefern den als Copaiba, Balsam bekannten Harzsaft: besonders geschätzt ist derjenige von *C. officinalis*, Jacq.; ebenso wertwollen Balsam liefern *C. guyanensis* (Desf.), O. Ktze., und *C. multizuga* (Hayne), O. Ktze., *C. confertiflora* (Benth.), O. Ktze., *C. coriacea* (Mart.), O. Ktze., *C. Langsdorffii* (Desf.), O. Ktze., und *C. oblongifolia*, Mart. (O. Ktze.)."

TAMARIND.

After describing *T. indica*, L., as yielding Pulpa Tamarindi conda, P. Taubert says (in *Ibid.*, p. 140): "Auch aus Westindien und Ecuador wird Tamarindenmuss, als amerikanische Tamarinden, bezeichnet, ausgeführt und in England bevorzugt. Dasselbe stammt von *T. indica*, L., *var occidentalis*, Gärtn."

BALSAM OF TOLU.

The same author (*Ibid.*, p. 191) says: "Auch *T. peruifera* (L. fil.), Baill., in der nordöstlichen Hälfte Südamerikas heimisch, liefert geringe Mengen eines festen aromatischen, den Tolubalsam ähnlichen Harzes."

SUMBUL.

The correction made by Mr. Holmes in his comment on this drug is apparently warranted, as there seems no question but that Indian sumbul is yielded by *Ferula sumbul* (Kffm.), Hook. fil., the roots of which are said to resemble those of *F. Narthex*, Boiss., the Bombay sumbul being the product of *Dorema Ammoniacum*. (See E. P., III. Theil, 8. Abth., Bog. 13–17, p. 232; and Pharmacographia, p. 312.)

AMMONIAC.

In the consideration of Ammoniac, O. Drude (in E. and P., III. Theil, 8. Abth., Bog. 13–17, p. 233) says: "Seit dem Jahre 1825 weiss man das seit Dioscorides also Ammoniacum bekannte Gummiharz der Gatt. Dorema entstammt, und zwar haupsächlich der einen, mit grosser Verbreitung von Persien bis tief in die Balchasch-Alakulwüste begabten Art, von welcher verschiedene Varietäten existieren; diese ist *Dorema Ammoniacum*, D. Don. Gleichfalls liefern Ammoniak gummi *D. aucheri*, Boiss., und *D. aureum*, Stcks."

STORAX.

F. Niedenzu, in the consideration of the genus Liquidambar (E. and P., III. Teil, 2. Abth., a., Bog. 7–9, p. 124), says: "Alle Artenfer Liquidambar (und Altnigia) liefern Storax. Am meisten geschätzt ist der von *L. orientalis* stammende, officinelle 'Storax liquidus.' Im amerikanischen, dort gleichfalls officinellen Storax wies Miller Storacin, zimmtsaurephenylpropylester und storesin nach; als "(Southern) sweet gum" ist das Balsamharz von *L. styraciflua* ein beliebtes Kaumiltel in Centralamerika und den südatlantischen Unionsstaaten."

IPECACUANHA.

In the editorial note upon Ipecacuanha no attempt was made to consider the nomenclature of the subject, as this had already been done by another writer (see *Proc. A. Ph. A.*, 1898, p. 243). It is apparent that in citing the present U.S.P. name a typographical error occurred. The authority for *Cephaelis Ipecacuanha* is (Brotero) A. Richard. The other point that Mr. Holmes takes exception to is a matter of opinion. But the results of experiments which will throw more light upon this subject, we have reason to believe, will be forthcoming during the next year.

SARSAPARILLA.

In the consideration of the genus Smilax, A. Engler (in E. and P., II. Teil, 5. Abth., Bog. 4–6, p. 90) says: "Da in den Handel nur diese und nicht die dazu gehörigen Stengel und B. gebracht werden, so ist schwer zu sagen, zu welchen Arten die einzelnen, anatomisch recht gut unterscheidbaren Handelssorten gehören. Doch wird *S. medica*, Schlecht. et Cham., als Stammpflanze der

Ostmexikanischen oder Veracruz-Sarsaparille. *S. officinalis*, H. B. K., als die der von Jamaika verschifften Sarsaparille, *S. papyracea*, Duham., in Guiana und Brasilien als Stammpflanze der Para-Sarsaparille angesehen; sicher ist mir die Zugehörigkeit der Veracruz-Sarsaparille zu *S. medica*."

RHUBARB.

U. Dammer, after considering the systematic features of the genus Rheum and the historical facts pertaining to rhubarb (E. and P., III. Teil, I. Abth., Bog. 1–3, p. 22), says:

"Zu unterscheiden ist zwischen Kron[1]- u. Canton[2]-Rhabarber. Erstere stammt, wie durch Przewalski unzweifelhaft festgestellt wurde, von *Rheum palmatum tanguticum* (s. "Gartenflora," 1875, p. 3, und 1882, p. 166), letztere von *Rheum officinale*, Baill. Vielleicht geben aber auch andere *Rheum*-Arten echte Rhabarber-sorten. So wurde lange zeit *Rheum australe*, Don, im Himalaya als echte Rhabarber betrachtet und wahrscheinlich liefern auch einzelne in Centralasien wachsende Arten, wie *R. leucorrhizon*, Pall., und die klein- und dickblattrigen Formen von *R. rhaponticum*, L., des Wesetnes Chinas echte Rhabarber, d. h., Wurzeln, die mehr wonderiger die gleichen Eigenschaften haben."

Not only were the results of these authorities considered, but also the investigations of others, as is seen, particularly, in the paragraphs relating to Myrrh,[3] Balsam of Tolu[4] and Storax.[5]

It is not a question, however, as to which of these experts is right, as this cannot be definitely settled at the present time; but what shall be the attitude of the Pharmacopœia in regard to the results of the labors of the different experts? The writer said, in the editorial note referred to, that "the question of the origin of

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[1] Moskowitsche, russische oder Kronrhabarber (Radix Rhei moscowitici s. optimi).

[2] Chinesische, ostindische oder Canton-Rhabarber.

[3] Myrrh.—E. M. Holmes in *Pharm. Jour.*, 1899, p. 295.

[4] In the National Dispensatory, p. 321, is the statement that "Professor Baillon regards the tree yielding Peru Balsam as identical with this [the tree yielding Tolu Balsam.—H. K.], and the difference of the two products as due to the manner in which they are extracted."

[5] Under Liquidambar, the National Dispensatory (p. 946) contains the statement that: "It will be observed that sweet gum agrees in composition with Storax, which, in addition, contains water mechanically mixed with it."

drugs is in some cases still obscure, and in other cases greater freedom should be given in the selection of commercial varieties." Why should the U.S.P. say that Rheum is "the root of *Rheum officinale*, Baillon, and not recognize with the B.P. and other authorities that the commercial rhubarb is likely to be the product of a number of species of Rheum?" Why should the B.P. say that Jamaica sarsaparilla is yielded by *Smilax ornata*, Hook f., when experts seem to recognize that the origin of all the sarsaparillas, except the E. Mexican or Vera Cruz root, is open to question? Why should not the pharmacopœial authorities recognize that in some cases more than one species may yield the commercial drugs and take cognizance of all the results of acknowledged experts?

Instead of limiting the number of species, when questions of doubt exist as to that number, the Pharmacopœia should append to its definition of such drugs a clause that "probably or possibly other species also yield the drug;" such as, for instance, in the case of Myrrh, Copaiba, etc., as the B.P. has done.

If there is any difference in the Myrrh, Copaiba or other drug from different species and sources, this can be provided for under descriptions, tests, etc.

Surely no objection can be raised to this attitude on the question, as it represents the actual conditions, and one which is not only in accord with, and worthy of pharmacopœial authority, but which will create additional confidence in the work as being nearer the truth.

Another point touched upon in the editorial note is one that Mr. Holmes does not refer to, but which is also of importance from the practical consideration of definitions in the Pharmacopœia. The U.S.P. defines Belladonnæ Folia as "the leaves of *Atropa Belladonna*, Linné," and describes under this drug only the leaves. The B.P. defines Belladonnæ Folia as "the fresh leaves and branches of *Atropa Belladonna*, Linn., collected when the plant is in flower," and describes the stems, leaves and flowers. The commercial drug contains generally not only stems, leaves and flowers, but also fruits, and the Pharmacopœia would do well to limit the amount of these different parts of the plant, as at times the drug is made up almost entirely of stems and some leaves, few if any flowers being present, while at other times there is an abundance of flowers and immature fruits.

Investigators of drugs too frequently do not seem to recognize that other parts of the plant yielding the drug, as well as parts of entirely different plants, are present in the commercial drugs—not necessarily as adulterants, but because the price of labor does not warrant evidently a careful garbling.

Not long ago a series of experiments were carried on by one of the students of the Philadelphia College of Pharmacy on Crocus (*Amer. Jour. Pharm.*, 1900, p. 119), and it was shown that none of the commercial drug was more than 90 per cent. pure (*i. e.*, contained only 90 per cent. stigmas) and that the commercial article ranged in purity from 46 to 90 per cent. (*i. e.*, contained 46 to 90 per cent. of stigmas). A reviewer, in commenting upon these results, said that he presumed they referred to powdered saffron, as the crude drug examined by him had been exceptionally pure. This comment shows still further the liability to err on this subject and how frequently even those who handle drugs continually are deceived as to their actual quality and value.

It is to be regretted that the Pharmacopœia gives sanction to the deception by presenting a standard which it is impossible to attain in many instances. In view, then, of this condition of affairs I still maintain that "there are a number of groups of drugs to which rather stringent definitions, descriptions and limits of admixture may be applied, as in seeds, fruits, roots, barks and flowers. In other cases, the difficulty of giving specific definitions is very clear, as for example, in the case of leaves and herbs, rhizomes and plant exudations. To say that certain drugs consist 'chiefly' of certain parts covers the ground a little better, *e.g.*, Crocus, chiefly of stigmas; Chondrus, chiefly of Chondrus crispus, etc. It would be better, however, if the amount of actual drug present in the commercial product could be given."

CONCLUSION.

Every botanist appreciates the difficulties connected with the nomenclature question and there should be some one guide that we can in the main follow. In the United States at least, the work of Engler and Prantl is becoming to a certain extent recognized as the authority on this question.

This is true also in regard to the origin of drugs, but neverthe-

less, every expert investigator should be given credit for his work, and where differences of opinion hold the Pharmacopœia should be more general in its definitions and define the drugs to which these differences apply as being obtained from "probably other species" and as "consisting chiefly of" certain plant parts. Furthermore, in the description of properties and tests the limit of impurity or admixture could be defined; or, in other words, definitions and descriptions, as well as tests, should be based upon the article in the market.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A HANDBOOK OF INDUSTRIAL ORGANIC CHEMISTRY adapted for the use of manufacturers, chemists and all interested in the utilization of organic materials in the industrial arts. By Samuel P. Sadtler. Third revised and enlarged edition. Philadelphia: J. B. Lippincott Company.

The first edition of this work was published in 1891 and the second in 1895. At the time of the publishing of the first edition there was no concise work in the English language treating of applied organic chemistry, and the book was a welcome addition to works on chemical technology. Since that time the value of the work has been shown by the necessity for two revisions and the translation of the book into German.

The contents of the book consist of a concise treatment of fourteen different classes of industries, including the following particulars of each: (*a*) Raw Materials; (*b*) Processes of Treatment; (*c*) Products; (*d*) Analytical Tests and Methods; (*e*) Bibliography and Statistics. The classes of industries treated of are the following: (1) Petroleum and Mineral Oil Industry; (2) Industry of the Fats and Fatty Oils; (3) Industry of the Essential Oils and resins; (4) The Cane Sugar Industry; (5) The Industries of Starch and its Alteration Products; (6) Fermentation Industries, including: (*a*) Nature and Varieties of Fermentation; (*b*) Malt Liquors and the Industries Connected Therewith; (*c*) The Manufacture of Wine; (*d*) Manufacture of Distilled Liquors or Ardent Spirits; (*e*) Bread-Making; (*f*) The Manufacture of Vinegar; (7) Milk Industries; (8) Vegetable Textile Fibres, including: (*a*) Paper-making; (*b*) Guncotton, Pyroxyline, Collodion and Celluloid; (9) Textile Fibres of Animal Origin; (10)

Animal Tissues and Their Products, including: (*a*) Leather Industry; (*b*) Glue and Gelatine Manufacture; (11) Industries based upon Destructive Distillation, including: (*a*) Destructive Distillation of Wood; (*b*) Destructive Distillation of Coal; (12) The Artificial Coloring Matters; (13) Natural Dye Colors; (14) Bleaching, Dyeing and Textile Printing. In the appendix are given: (*a*) The Metric System; (*b*) Tables for Determination of Temperature; (*c*) Specific Gravity Tables; (*d*) Alcohol Tables; (*e*) Physical and Chemical Constants of Fixed Oils and Fats.

It will be seen that this handbook is not only a technology, but also an analytical industrial organic chemistry. The manner of treatment of the industries considered is clear, concise and from the point of view of one having a large amount of practical experience. There are 126 illustrations and 16 diagrams showing outlines of processes employed in the different industries. The book is not only valuable from the standpoint of the manufacturer and chemist, but is equally valuable as a text-book for universities and schools of technology where industrial organic chemistry is being taught.

The present revised edition has been brought up to date by the incorporation of the results of progress in the different industries during the past five years. Some of the chapters, in fact, as those on the natural and artificial dye colors, have been largely rewritten. The progress in the applied sciences is so remarkable that books become antiquated in a comparatively few years. On the other hand, there is so much being published in regard to methods which at first seem plausible, but which in a few years may be found to be wholly erroneous or impracticable. It is therefore necessary, in order for books to be safe, that revisions be not too frequent. On the other hand, if they are to be up-to-date revisions they must not be delayed too long. The experience of the past 10 years indicates that in not only the conception of this handbook, but in its revisions, the author has been singularly fortunate, and the third edition, which has been thoroughly revised and brought up to date, is to be recommended.

STUDENTS' EDITION, A PRACTICAL TREATISE OF MATERIA MEDICA AND THERAPEUTICS, with special reference to the clinical application of drugs. By John V. Shoemaker. Fifth edition. Thoroughly revised. 6¼ x 9½ inches. Pages vii–770. Extra cloth, $4 net; sheep, $4.75 net. F. A. Davis Company, publishers, 1914-16 Cherry Street, Philadelphia.

The author's experience has led him to change the scope of the fifth edition of his Materia Medica and Therapeutics, and he has decided to divide the work into two independent issues: (*a*) the students' edition, which has been just issued; (*b*) and the physicians' edition. In the students' edition the drugs are limited to those of the Pharmacopœias of the United States and Great Britain. The physicians' edition, it is presumed, will be much more comprehensive.

The present students' edition is a valuable work on the clinical application of drugs. One of the most fortunate things in the book is the author's preface concerning the use of the metric system of weights and measures. The author says: "It is, no doubt, destined eventually to supersede the older system so long employed in English-speaking countries. The metric system has the important advantage of establishing a uniformity of notation throughout the civilized world. In order to facilitate its universal adoption, it is desirable that the student should be trained in its use from the beginning of his professional course." The book is divided into two parts, Part I treating of (*a*) General Considerations Concerning Remedies and Systems of Treatment; (*b*) Pharmacology and the Pharmacopœia; (*c*) Materia Medica; (*d*) Pharmacy; (*e*) Prescription Writing and Formulæ; (*f*) Poisons and Antidotes; (*g*) General Therapeutics and Classification of Remedies. In Part II are given the pharmacology, physiological action and therapy of drugs of the U.S.P. and B.P. The work is in reality one treating primarily of the clinical application of remedial agents. The author unfortunately does not make clear the distinction between medicines and drugs, and uses the term pharmacology as meaning the description and physical properties of drugs. The book has incorporated into it the results of the more recent clinical investigations, contains numerous formulæ and much valuable information concerning the clinical application of remedial agents.

General Vegetable Pharmacography. By Albert Schneider. Chicago: Chicago Medical Book Company.

This book of 136 pages is designed to serve as a supplement to any of the existing text-books on vegetable pharmacography, and treats of the following subjects:

(1) General Discussion of the Senses.

(2) Special Discussion of the Senses with Reference to the Examination of Vegetable Drugs.

(3) Causes Modifying the Characteristics of Drugs.

(4) The Histology of Vegetable Drugs.

The book will no doubt prove of value to students who are engaged in a study of vegetable drugs.

A TEXT-BOOK OF CHEMISTRY. By Samuel P. Sadtler and Virgil Coblentz. Being the third revised and enlarged edition of Sadtler and Trimble's Chemistry. In two volumes. Philadelphia: J. B. Lippincott Company.

The appearance of another revised and enlarged edition of this well-known chemistry in two years speaks for the value of this book. The new edition is characterized by an enlargement of the part dealing in elementary physics, electrolysis and electro-metallurgy and the periodic system. In the chapters on physics over fifty new illustrations alone have been added. In thus developing the part on elementary physics, the authors have shown excellent judgment. The student in pharmacy and the applied sciences cannot have too much of the fundamental training in physics—indeed, a physical laboratory is to-day almost to be considered essential to the proper understanding of natural phenomena and the application of such knowledge in the construction of apparatus for use in the arts and sciences. No man can be a successful manufacturer who is not familiar, both theoretically and practically, with the general and special properties of matter and energy, and who is not well acquainted with the nature and application of heat, light and electricity. Probably the most fertile of all the departments of physics is that relating to electricity. The applications of electricity are seen on every hand. In chemistry it is applied to electro-chemical analysis, electrotyping, electroplating, electric refining of metals, electrolysis of alkali chloride, electrolytic preparation of hypochlorites, chlorates, caustic alkalies, metallic arsenic and antimony, ozone, white lead, the carbides, phosphorus, iodoform, chloral, chloroform, nitro-compounds, saccharine, organic colors, etc. The present edition contains a concise treatment of the processes involved in the above-enumerated applications.

The new edition, which has been enlarged and thoroughly revised, contains all of the valuable features of the earlier editions,

and it is highly probable that there is no chemistry published in the English language for the use of medical and pharmaceutical students that treats so concisely, thoroughly and accurately of the departments of physics and chemistry and their application in medicine and the arts.

MINUTES OF THE PHARMACEUTICAL MEETING.

The third of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy, for 1900–1901, was held on Tuesday, December 18, 1900. James T. Shinn, a well-known member of the College, presided. The meeting was an exceptionally valuable one owing to the number of practical matters that were discussed. Dr. Henry Leffmann spoke on the subject of high and low explosives, exhibiting samples of the powders used in modern warfare; also giving a few practical demonstrations of the mode of action of explosives. His address was in part as follows:

"Various mixtures of a more or less explosive character were used in ancient times. Greek fire is believed to have been a mixture of bituminous matters, nitre and sulphur. This would burn under water and was used with great destructive effect before the invention of firearms. Cannon were used over five hundred years ago. It is stated that the cannon used at the siege of Constantinople in 1453 was fired only about eight times a day.

"The increase in the size of cannon in modern times has necessitated increase in the size of the grains of powder, because a very fine grain powder would be too powerful. I have here specimens of the large hexagonal grains of ordinary black powder, also the brown powder, the latter containing a charcoal of lighter color. These specimens are intended for the large cannon. Here are cubical grains about the size of common dice intended for rapid-fire guns, also spherical grains about ½ inch in diameter. Another interesting class is that in which sodium nitrate is substituted for potassium nitrate. Contrary to what I have always been taught, this powder is not appreciably deliquescent. The use of the sodium compound is, of course, for the sake of economy. These powders are used for mild blastings, such as getting out coal. Here is a sample of Dupont's CCC grade, the grains of which are nearly as large as peach-kernels.

"Modern high explosives are essentially nitro-compounds, forms of nitrocellulose or nitroglycerin. The solubility of nitrocellulose in volatile solvents permits of forming it into any shape or mixing it with any substance. Some of the common smokeless powders are similar to celluloid. The formulæ are often secret, but nitrocellulose is the foundation ingredient. Here is one of the ribbon forms. Cordite is in cylindrical sticks. Here are short, thick cylinders of the Maxim-Schüpphaus type, perforated as you see with longitudinal openings to permit the free rush of flame through the mass. Several sizes of these are on the table, the largest about 3 inches long by 1 inch in diameter, the smallest 1 inch long by less than a half inch in diameter. When burning in the open air these smokeless explosives do not show much energy, although there is evidently a large gas disengagement with little smoke and very little solid residue. In connection with this experiment it is interesting to note the effect of heating ammonium dichromate, in which an active internal combustion occurs, but the fact that one product, chromic oxide, is solid, greatly diminishes the energy of the combustible, though the action is analogous to that which occurs in guncotton."

J. Percy Remington exhibited and described "A Pharmacist's Apparatus Stand" (see page 19). The chairman, Mr. Shinn, commended the apparatus as having certain very admirable features, and said that when he was actively engaged in the drug business he had constructed a stand for use in a closet in which the space in a vertical direction was utilized.

F. W. Haussmann read a paper on "The Discoloration of Syrup of Iodide of Iron," and exhibited numerous specimens. (See page 16.) Dr. Leffmann, in commenting on the paper, said that possibly the metallic salt caused an inversion of the sugar with consequent discoloration of the syrup, as has been shown in a paper recently by Dr. J. H. Long, of Northwestern University. In reply to a question by Mr. Shinn, as to the use of glycerin in preserving the syrup, Mr. Haussmann said that the question of chemical action arose when this substance is used, as glycerin, being glyceryl hydrate when acted upon by iodine or its compounds, possibly forms allyl compounds as allyl iodide. Mr. Joseph W. England exhibited a specimen from the Museum of the College, which had been made by Professor Procter (this JOURNAL, 1868, p. 108), January 15, 1865, using glycerin, and which was not discolored. He also stated that in making the syrup

care should be taken that the grease should be removed from the iron, and that he had found iron card teeth preferable to iron raspings; also that it was necessary to heat the solution to ensure the end reaction.

Mr. Shinn remarked that he used to put a coil of iron wire in the bottles containing the syrup to ensure the iron being kept in the ferrous state.

Melvin W. Bamford read a paper on "Benzoinated Lard," and exhibited some specimens. (See page 29.) Mr. Wiegand said that he found it best to expose as great a surface as possible to the finely powdered benzoin at as low a temperature as possible, and then strain the product through canton flannel. Professor Lowe referred to Mr. Beringer's remarks made at a previous meeting (see Vol. 72, p. 559), and also to the method of making benzoinated lard which was employed by Mr. Webb. The principle was the same as that referred to by Mr. Wiegand, in that alternate layers of powdered benzoin and lard were digested at a temperature just sufficient to melt the lard. Mr. Shinn remarked that he used to dissolve the benzoin in alcohol and then digest this with the melted lard until the alcohol evaporated, after which the powder was allowed to settle, and when cool the upper part was removed. Mr. Haussmann said that, in his experience, the benzoin in either an alcoholic or ethereal solution was likely to become shredded, particularly in an ointment consisting of lard and wax.

Mr. Bamford said that there was one point to which he desired to call particular attention, that in making leaf lard from the fatty tissues no water was employed, this being the process proposed by Professor Redwood and adopted by the British Pharmacopœia. The usual custom by manufacturers of lard is to wash the lard with water, and some of it is then removed by heat.

In discussing the subject, Professor Kraemer remarked that he was heartily glad that Mr. Bamford had taken up this subject, as it demonstrated what could be done if pharmacists really desired to secure good materials wherewith to make pharmaceutical preparations. It has been supposed that a good leaf lard was very difficult to obtain, and it would appear that the method of making the lard from the animal tissues was an expensive process, whereas Mr. Bamford showed that it was an economical one.

Mr. Kebler read a paper on "The Testing of Essential Oils,"

which was a joint paper by himself and Dr. Pancoast. (See page 1.) Mr. England referred to a commercial specimen of oil of sandalwood, which was found to contain 90 parts of sandalwood oil, 7 parts of alcohol and 3 parts of chloroform. This oil had the same specific gravity as the U.S.P. required, and also answered the tests for solubility. Professor Lowe referred to the fact of the enormous quantity of cloves which is distilled in this country and also to the fact that one large manufacturing house, in order to ensure the purity of oil of sandalwood, imports the sandalwood for distillation. He also referred to the fact of oil of rose being adulterated with oil of ginger-grass and finally stated that he did not see any great harm, therapeutically, in the substitution of oil of birch for oil of wintergreen, as the oil of birch contained nearly all methyl salicylate and the oil of wintergreen 90 per cent. Mr. Kebler further remarked that kerosene is often used to adulterate essential oils, the low boiling kerosene being employed to adulterate the oils having low boiling points and the high fraction kerosene with those having a high boiling point. H. K.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The next meeting of the Association will be held at St. Louis, September 16–21, 1901.

The Section on Practical Pharmacy and Dispensing announces the following:

Through the generosity of Dr. Enno Sander, Ex-President of the American Pharmaceutical Association, the Practical Pharmacy and Dispensing Section is enabled to offer *a Cash Prize of Fifty Dollars* for the most worthy paper or report presented to it, upon the following conditions: (1) All competitors must be members of the American Pharmaceutical Association, and actively engaged in the retail drug business—principals and assistants equally acceptable—and shall not be connected with the teaching department of any school or college of pharmacy. (2) The subject discussed or reported upon shall be within the scope of pharmaceutical manipulations, dispensing or the actual doings of a retail drug store. (3) All competing papers or reports must be in the hands of the Secretary of the Section, F. W. E. Stedem, Corner Broad Street and Fairmount Avenue, Philadelphia, Pa., on or before July 1, 1901, and must be marked "For competition."

CLASSES

OF THE

PHILADELPHIA COLLEGE OF PHARMACY,

Eightieth Annual Session, 1900-1901.

FIRST YEAR CLASS LIST.

Name.	*Place.*	*State.*	*Preceptor.*
Adams, John Howard,	Reading,	Pa.	W. Scott Adams.
Albert, Howard,	Freeland,	Pa.	M. E. Grover.
Allen, Robert Wallin,	Philadelphia,	Pa.	Funk & Groff.
Ames, Arthur Garfield,	Vineland,	N. J.	Bidwell & Co.
Anthony, Herbert Spencer,	Reading,	Pa.	P. A. Dietrich, P.D.
Armstrong, Joseph Massey,	Church Hill,	Md.	Dr. R. L. Lindsay.
Atkinson, Mary Elizabeth,	Altoona,	Pa.	Dr. G. W. Wood.
Baas, Charles Wesley,	Scranton,	Pa.	S. L. Foulke.
Baker, Victor Louis,	Bridesburg, Phila.,	Pa.	Wm. Morrett.
Bachman, Harry Stanley,	Philadelphia,	Pa.	Samuel Evans, Jr.
Babbitt, Theodore Perley,	Brattleboro,	Vt.	Geo. E. Greene.
Bailey, Clarence Matthews,	Zanesville,	Ohio.	Bailey Drug Co.
Banta, Edwin, Jr.,	Lansdowne,	Pa.	Harry M. Davis.
Berry, Lawrence Frank,	Charlestown,	W. Va.	Robert T. Berry.
Bibby, David Boone,	Catawissa,	Pa.	
Billetdoux, Chester Augustus,	N. Adams,	Mass.	George A. Hastings.
Billups, James Sykes,	Columbus,	Miss.	Freeman & Pettyjohn.
Bonta, Clarence LaRue,	Hanover,	Ind.	A. B. Morse.
Boyd, Guy Stephen,	York,	Pa.	Dale & Co.
Brunhouse, Harry Franklin,	York,	Pa.	F. Brunhouse.
Buchert, Charles Frederick,	Philadelphia,	Pa.	John B. Reynolds.
Burkholder, Lloyd Amadore,	Shippensburg,	Pa.	Fleming & Fleming.
Burt, Arthur Henry,	Elmira,	N. Y.	J. P. Kelly.
Chambers, Francis J.,	Atlantic City,	N. J.	E. S. Reed's Sons.
Coleman, William Fogg,	Nicetown, Phila.,	Pa.	Mahlow Kratz.
Cooney, William Francis,	Florence,	Mass.	
Cooper, Clyde,	Lancaster,	Pa.	H. M. Snyder.
Cornwell, Joseph Clark,	New London,	Conn.	Moon's Pharmacy.
Cossaboom, Herbert Solomon,	Bridgeton,	N. J.	Wm. Clarence Berger.
Crossley, Samuel Wallace,	Corpus Christi,	Tex.	Andrew Blair & Co.
Currinder, Alva,	Wilmington,	Del.	N. B. Danforth.
Curtis, Frank Duezze,	San Jose,	Cal.	
D'Alemberte, Herbert Harry,	Pensacola,	Fla.	Ernest W. Petterson.
Dana, Clyde,	Caledonia,	Ohio.	C. E. Kelly.
Daub, Charles Melvin,	Norristown,	Pa.	Bunting & Yeakle.
Davis, Howard Sherman,	Reading,	Pa.	Smith, Kline & French Co.
Davis, John Hall,	Lansdowne,	Pa.	Harry M. Davis.
Davis, Thomas Carroll,	Thorndale,	Pa.	G. N. Thompson.
Decker, Harry Francis,	Johnstown,	Pa.	Chas. Griffith.
Desher, Edward Winert,	Philadelphia,	Pa.	
Dilks, John,	Philadelphia,	Pa.	Harmon Dilks, Jr.
Donnelly, William Michael,	Salem,	N. J.	C. A. Eckels.

Name.	*Place.*	*State.*	*Preceptor.*
Dubbs, Carbon P.,	Pittsburg,	Pa.	
Ebert, James Monroe,	Gordon,	Pa.	J. E. Gregory.
Eccles, Byron Jackson,	DeLand,	Fla.	Geo. W. Fisher.
Edwards, Lawrence,	Trackville,	Pa.	Dr. David Taggart.
Eichold, Bernard Herbert,	Mobile,	Ala.	Mobile Drug Co.
Eldridge, Roy Kerr,	Coldwater,	Mich.	
Everham, H. Valentine, Jr.,	Ambler,	Pa.	
Eyster, Geo. William,	York,	Pa.	W. E. Boose.
Fox, Miss Jamella,	Tamaqua,	Pa.	N. A. Porter.
Fox, Morris Wayne,	South Bethlehem,	Pa.	M. M. Buss.
Fralinger, John Joseph,	Philadelphia,	Pa.	Dr. T. H. McFarland.
French, Leroy Brown,	Houlton,	Me.	O. F. French.
Frantz, Geo. Adam,	Lebanon,	Pa.	Pretzel's Pharmacy.
Gable, Edmund James,	Reading,	Pa.	Harry J. Schad.
Galbraith, Wm. H., Jr.,	Germantown, Phila.,	Pa.	W. H. Galbraith.
Galer, Fread. Joseph,	Philadelphia,	Pa.	H. G. Kalmbach.
Gamer, Albert Chas. C.,	Tamoca,	Wash.	Dr. W. H. Kellogg.
Garvey, Joseph Peter,	Philadelphia,	Pa.	J. Francis Hauck.
Geiger, Fredk. Luther,	Pillow,	Pa.	E. E. Wilson & Co.
Geisking, John Leroy,	Harrisburg,	Pa.	J. Wilson Hoffa.
Gerson, Dora Goldie,	Muscow,	Russia.	
Glaspell, Wm. English,	Bridgeton,	N. J.	Chas. F. Dare & Son.
Gould, Lewis Elms,	Presque Isle,	Maine.	S. W. Boone & Co.
Gladfelter, Wilford Stanley,	Seven Valley,	Pa.	
Griggs, Alfred,	Sandwich,	England.	I. E. McNair.
Guier, Luis Javier,	Cartago,	Costa Rica.	Guillero Guier.
Guthrie, Ira Culpepper,	Temple,	Texas.	W. E. Willis.
Harbold, John Tilden,	York,	Pa.	R. W. Zeigler.
Harbaugh, Duncan James,	Haverford,	Pa.	W. L. Harbaugh.
Harkness, Edw. Gehring,	Carlisle,	Pa.	Dr. B. F. Emrick.
Harmening, Fredk. H.,	Defiance,	Ohio.	N. G. Woodward.
Harris, James Nixon,	Millville,	N. J.	M. L. Branin.
Hayn, Herman Ernest,	Springfield,	Mass.	J. H. Manning.
Hecker, Andrew Ned,	Carlisle,	Pa.	John E. Sipe.
Hemmersbach, Henry Wm.,	Philadelphia,	Pa.	E. W. Hermann.
Herflicker, Walter Esterley,	Reading,	Pa.	Wm. P. M. Zeigler.
Hetherington, Jas. Norton C.,	Philadelphia,	Pa.	Thos. Hetherington.
Hoerner, Guy Hoover,	Mechanicsburg,	Pa.	C. A. Eckels.
Hoey, Alexander,	Philadelphia,	Pa.	Edw. C. Stout.
Holcombe, John Heisler,	Bridgeton,	N. J.	David H. Holcombe.
Holstein, Geo. Leon,	Lebanon,	Pa.	Geo. W. Schools.
Hoover, Robert Adams,	Du Bois,	Pa.	Mr. A. P. Holland.
Howard, Carrie Elizabeth,	Philadelphia,	Pa.	Carrie E. Howard.
Johnson, Edw. Thomas,	Philadelphia,	Pa.	Wm. B. Lentz.
Johnson, Chauncey Nicholas,	Uniontown,	Pa.	H. S. Clark.
Jones, Edw. DeMaur,	Philadelphia,	Pa.	
Jones, Clarence,	Doe Run,	Pa.	W. R. Sharp.
Jones, Virginia Violetta,	Wilkesbarre,	Pa.	
Keener, James Blaine,	Middletown,	Pa.	John W. Renalt.
Keller, Martin Luther,	Steelton,	Pa.	W. K. Martz.
Kempte, Floyd Budd,	Mt. Holly,	N. J.	Elmer D. Prickett, M.D.
King, Grant Wagner,	Lafayette,	Ind.	Wm. A. Musson.
Kisner, Geo. Williamson,	Belmar,	N. J.	Bloomfield Hulich.
Klein, Frank Bengler,	Henderson,	Ky.	W. S. Johnson & Son.
Koons, Chas. Eyster,	Harrisburg,	Pa.	E. Z. Gross.
Leaman, John Benjamin,	Strasburg,	Pa.	J. M. Tronsfield, Jr.
Lebo, Chas. Spears,	Lebanon,	Pa.	Chas. H. Blouch.
Lee, Robert Edward,	Carlisle,	Pa.	J. E. Seebold.
Light, Chas. Augustin,	Lebanon,	Pa.	John F. Loehle
Linde, Henry Mohre,	Philadelphia,	Pa.	Robert McNiel.

Name.	*Place.*	*State.*	*Preceptor.*
Lisser, Joseph North,	Haddonfield,	N. J.	Frank P. Rogers.
Lord, Geo. Washington, Jr.,	Haddonfield,	N. J.	
Loyer, Marcus Brownson,	Philadelphia,	Pa.	Chas. A. Eckels, Ph.G.
McGuire, Jos. Francis,	Mahanoy City,	Pa.	Thos. E. McGuire.
McHale, Chas. Joseph,	Shenandoah,	Pa.	Paul W. Houck.
Mader, James Wilson,	Shenandoah,	Pa.	J. B. Moore.
Malloy, Westley General,	Philadelphia,	Pa.	Addington LaDow.
Markle, Howard Overholt,	New Haven,	Pa.	T. J. Connell, P.D.
Marvin, Joseph,		Germany.	
Mayers, James Curtis,	Piney Creek,	Md.	C. Carroll Meyer.
Mayerson, Frances Rose,	Philadelphia,	Pa.	M. Peissakovitch.
Mershon, Ray,	Easton,	Pa.	Edward K. Cope.
Michael, Horace,	Lebanon,	Pa.	Charles A. Boger.
Monroe, Frank D. Montague,	Logan,	O.	F. W. E. Stedem.
Montgomery, John Hinks,	Bucksport,	Me.	Richard B. Stover.
Moore, Augustine Curtis,	Portsmouth,	Va.	C. J. Brownley.
Morgan, Harold Bertram,	Philadelphia,	Pa.	Frank E. Morgan.
Moyer, Lewis Nathan,	Reading,	Pa.	E. M. Boring.
Musson, Katharine Johanna,	Philadelphia,	Pa.	Wm. A. Musson.
Neiler, Wm. Mackie,	Philadelphia,	Pa.	Wm. A. Whitten.
Newman, Marguerite May,	Ontario,	Ore.	Snyder & Newman.
Newhard, Jas. Gillespie B.,	Fernwood,	Pa.	Chas. E. Keeler.
Newton, Clyde Burdick,	Findlay,	O.	Newton Bros.
Pitts, Milton Warren,	Lynn,	Mass.	
Plaster, John Edgar,	Charlotte,	N. C.	Woodall & Sheppard.
Prosser, Elmer Oscar,	Hellertown,	Pa.	Cyrus Jacoby.
Prowell, Tolbert,	Steelton,	Pa.	Dr. W. R. Prowell.
Raker, Edward Heller,	Pillow,	Pa.	John W. Raker.
Reburn, Albert Randolph,	Oxford,	Pa.	Miss Millie Baker.
Reading, Augustus R.,	Lambertville,	N. J.	Geo. M. Shamalia.
Reed, James Garfield,	Taffin,	O.	D. S. Fergerson.
Roth, Emil Krieger,	Johnstown,	Pa.	Kredel & Farrel.
Rothwell, Eugene,	Willow Grove,	Pa.	Robert S. Doake.
Rubin, Dora,	Oremburg,	Russia.	Dr. Joffe.
Schmidt, Otto Waldemar,	Canton,	O.	Henry Mueller, M.D.
Shiffer, Daisy Rhodes,	Hudson,	Pa.	Bert B. Shiffer.
Shillito, Chas. Emmert,	Waynesboro,	Pa.	Mentzer & Clugston.
Shrenk, Murray Hamilton,	Harrisburg,	Pa.	W. R. Laird.
Shull, David Frank, Jr.,	Philadelphia,	Pa.	D. F. Shull & Co.
Shulte, Frank Xavier,	Philadelphia,	Pa.	Dr. Emil Jungmann.
Smith, Clarence,	Philadelphia,	Pa.	G. Y. Wood.
Smith, Frank G. D.,	Grand Forks,	N. D.	
Smith, Henry Addison,	Binghampton,	N. Y.	C. W. Knape.
Smith, Jacob Schall,	York,	Pa.	Wm. Smith & Co.
Snyder, David Stahl,	Somerset,	Pa.	G. W. Benford.
Sognis, Michael James,	Trenton,	N. J.	Mary M. Tidd.
Stallsmith, Walter Edward,	Parsons,	Pa.	Henry H. James.
Still, Israel Thomas,	Boston,	Mass.	H. C. Blair.
Stimmel, Irvin Sigfried,	Kutztown,	Pa.	N. F. Weisner.
Stine, W. Earl,	Williamsport,	Pa.	R. P. Blackburn.
Stolz, David,	Syracuse,	N. Y.	Geo. E. Thorpe.
Strayer, Francis Williard,	York,	Pa.	Wm. Smith & Co.
Stuck, Williard Stearns,	Miffinburg,	Pa.	J. H. Sterner.
Stump, Frank Arthur,	Harrisburg,	Pa.	J. W. Cotterel.
Sutliff, Jacob,	Bloomingdale,	Pa.	E. F. Swartz.
Taggart, Alexander H. Supplee,	Norristown,	Pa.	G. C. Taggart.
Tripmaker, Walter Wm.,	Philadelphia,	Pa.	E. H. Fienhold.
Tuohy, James Louis,	Woodstown,	N. J.	Geo. M. Andrews.
Van Dyke, James P.,	Sunbury,	Pa.	James Van Dyke.
Walmsley, Chas. Edward,	Philadelphia,	Pa.	Aquila Hock, Ph.G.
Welsh, Ralph Lignori,	Altoona,	Pa.	R. E. Welsh.

Name.	*Place.*	*State.*	*Preceptor.*
Wilson, Harry William,	Wappinger's Falls,	N. Y.	Geo. H. Howarth.
Wolford, Walter James,	Allen,	Tex.	J. P. Harding.
Wolf, Wm. Aloysius,	Reading,	Pa.	F. X. Wolf.
Woodside, Jno. Montgomery,	Danville,	Pa.	W. J. Pechin.
Young, Samuel,	Philadelphia,	Pa.	L. C. Funk.
Zimmerman, Chas. Sumner,	York,	Pa.	W. L. Smyser.

SECOND YEAR CLASS LIST.

Name.	*Place.*	*State.*	*Preceptor.*
Ackerman, Wm. Brown,	E. Mauch Chunk,	Pa.	Geo. L. Cainan.
Allen, Edwin Cullom,	Philadelphia,	Pa.	Dr. O. E. Henritzy.
Alston, Wm. Algeron,	Haygood,	S. C.	J. B. Cook.
Anderson, L. C.,	Reading,	Pa.	H. H. Kline.
Ashmead, Virden P.,	Philadelphia,	Pa.	Anna S. Ashmead.
Bacon, Vela,	Freehold,	N. J.	Bacon & Pittinger.
Baer, Herbert Oscar,	Wheeling,	W. Va.	W. S. Dickson.
Baker, Daniel,	Bellevinon,	Pa.	
Beegle, David Elmer,	Bedford,	Pa.	Heckerman Drug Co.
Bair, Edward Elmer,	York,	Pa.	John S. Weakley.
Bell, Herman Alonzo,	Philadelphia,	Pa.	Theodore Campbell.
Berberich, Joseph Herman,	Stein,	Germany.	James Moffet, Jr.
Binder, Arthur Henry,	Titusville,	Pa.	F. W. Renting.
Blew, Robert Sinclair,	Bridgeton,	N. J.	P. W. Shull.
Blough, Elijah Robert,	Holsopple,	Pa.	A. D. Yoder, M.D.
Bornemann, John Alexander,	W. Philadelphia,	Pa.	Dr. W. H. Hickman.
Boyer, Walter Ernest,	Danville,	Pa.	F. Ross Horner.
Brown, Horsey P.,	Wilmington,	Del.	Z. James Belt.
Brown, Joel Daniel,	Philadelphia,	Pa.	
Bryant, James Robeson,	Stroudsburg,	Pa.	W. H. Umstead.
Caden, Alice Beatrice,	Lexington,	Ky.	McAdams & Morford.
Catlin, Jos. Albert,	Church Hill,	Md.	Jos. J. Kelly.
Clemmer, John Krupp,	Lansdale,	Pa.	C. J. Biddle.
Craven, Alfred Young,	Bridgeport,	Pa.	Harry Lee Randall.
Crawford, Thos. Foster,	Camden,	N. J.	C. B. McLaughlin.
Croft, Clarence,	Chambersburg,	Pa.	C. L. Giger & Co.
Crothers, Anthony Brooks,	Zion,	Md.	J. L. Crothers.
Dickinson, Ralph Brinton,	Parkesburg,	Pa.	Charles Leedon.
Dix, Robert Youngs G.,	Moorestown,	N. J.	G. H. Wilkinson.
Douglass, John Xavier,	Philadelphia,	Pa.	D. J. Reese.
Downs, Wm. Joseph,	Coaldale,	Pa.	John H. Bailey.
Dufford, J. Albert,	West Sunbury,	Pa.	J. T. Miller.
Eckels, Nathaniel Ort,	Shippensburg,	Pa.	W. G. Nebig.
Evans, Thomas John,	Plymouth,	Pa.	Geo. J. Durbin.
Eves, Charles Scott,	Millville,	Pa.	Charles S. Eby.
Evrard, John Joseph,	Bethlehem,	Pa.	Geo. D. Kressler.
Faust, Peter Wenner,	Claussville,	Pa.	H. L. Kiper.
Fetterolf, Clarence F. G.,	Ashland,	Pa.	H. C. Stiles.
Filman, Walter Theodore,	Warwick,	Pa.	H. L. Klopps.
Fitch, James Clarence,	Philadelphia,	Pa.	Dr. P. Fitch.
Fleischer, Wm. Paul,	Philadelphia,	Pa.	Dr. Frank E. Johnson.
Fox, Irvin Berry,	Lebanon,	Pa.	J. L. Lemberger & Co.
Fox, Joseph Peter,	Philadelphia,	Pa.	Peter P. Fox, Sr.
Fried, Percy,	Allentown,	Pa.	Frank P. Semmel.
Gage, Luther Hendrick,	Luraysville,	Pa.	W. D. Johnson.
Gearhart, Malcolm Zieber,	Reading,	Pa.	S. S. Stevens.
Gehringer, Edwin Franklin,	Allentown,	Pa.	O. B. J. Haines.
Geron, Yeatman,	Huntsville,	Ala.	J. D. Humphrey & Son.
Gettel, John Ralph E.,	Shippensburg,	Pa.	J. C. Altick & Co.

Name.	*Place.*	*State.*	*Preceptor.*
Goodman, Edith Morton,	Denver,	Col.	Dr. Susan Hayhurst.
Goring, Myatt Edward,	Wappinger Falls,	N. Y.	George Howarth.
Grove, Harry Ross,	Alexandria,	Pa.	Russell T. Blackwood.
Handwork, Francis C.,	Birdsboro,	Pa.	R. Clark.
Hanington, Bertram John,	New Brunswick,	Canada.	Mr. Yeaby, Manager.
Hawkins, Louis J.,	Coatesville,	Pa.	W. S. Young.
Hayes, John Gilbert,	St. Clair,	Pa.	I. Cohen.
Heffelfinger, Wm. Edward,	Reading,	Pa.	J. H. Stein.
Hendrickson, Raymond,	San Francisco,	Cal.	W. H. Gano.
Hertzler, Norman Eberley,	Philadelphia,	Pa.	Fred. Brown Co.
Hertzler, Oliver Henry,	Lancaster,	Pa.	C. A. Heinitsh.
Hilliard, Bayard,	Vincenttown,	N. J.	F. F. Hilliard.
Hibbs, Wm. Buckman,	Newtown,	Pa.	Walter R. Elliott.
Hougendobler, Harry Smaltz,	Columbia,	Pa.	L. H. Hirst.
Irwin, John Henry,	Philadelphia,	Pa.	Alex. Wilson.
Jago, Harry W. Garfield,	Millville,	N. J.	R. L. Haus.
Jefferis, Charles Albert,	Philadelphia,	Pa.	Funk & Groff.
Jones, Howard Harlan,	Norristown,	Pa.	Atwood Yeakle.
Kane, Augustin Francis,	Brooklyn,	N. Y.	F. F. Drueding.
Kellar, William Albert,	Denver,	Col.	Dr. Ballantine.
Kirk, Frank H.,	Curwensville,	Pa.	Shinn & Baer.
Knabb, Daniel Milton,	Limekiln,	Pa.	W. H. Reeser.
Knauss, Howard James,	Allentown,	Pa.	Dr. R. C. Peters.
Koller, Charles Joseph,	Altoona,	Pa.	C. G. Neeley.
Kyle, Christian B.,	Middletown,	Pa.	Chas. E. Bauer.
Lebegern, Barton,	Columbia,	Pa.	Eberly Brothers.
Lescure, Anna Rosalie,	Philadelphia,	Pa.	Dr. John B. Chapin.
Lewis, Herbert Williard,	Springfield,	Mass.	Harry P. Elsey.
Lide, Leighton Elba,	Columbus,	Miss.	Mayo & Weaver.
McGarrah, Wm. Henry, Jr.,	Scranton,	Pa.	T. D. MacPhee.
McGregor, Albert Dell,	Maywood,	Ill.	G. M. Beringer.
McLaughlin, Harry Aloysius,	Philadelphia,	Pa.	N. Richardson.
Marcus, Simon,	Philadelphia,	Pa.	W. A. Shannon.
Margolin, Mrs. Fannie B.,	Jico,	Russia.	H. J. Hackett.
Martin, Charles Edward,	Columbia,	Pa.	W. L. Bucher.
Martin, Frederick Adam,	Atlantic City,	N. J.	J. V. Townsend.
Martin, John M.,	Birmingham,	Ala.	W. R. Gunn.
Matlack, Walter Ball,	Bridgeton,	N. J.	Geo. Y. Wood.
Meals, Ira Dale,	Harrisburg,	Pa.	C. T. George, Ph.D.
Meredith, Wilbur Curtis,	Coatesville,	Pa.	R. H. Lackey.
Metzler, Oscar Leroy,	Harrisonville,	Pa.	J. A. Fergusson.
Miller, Roy L.,	Philadelphia,	Pa.	
Myers, Luther M.,	Carlisle,	Pa.	G. B. Evans.
Noble, Harry Carty,	Manayunk, Phila.,	Pa.	Howard M. Levering.
Oberly, John S.,	Bethlehem,	Pa.	Walter Crawford.
O'Hanlon, Joseph Thornley,	Pennington,	N. J.	G. W. Scarborough.
Parker, James Heber,	Reading,	Pa.	J. H. Stein.
Phillips, Elliott Earl,	Philadelphia,	Pa.	W. P. Bender.
Quinn, Vincent De Paul,	Lansford,	Pa.	J. A. Quinn.
Ramsaur, David Wilfong,	Palatka,	Fla.	Ackerman & Stewart.
Raum, Harry Angle,	Shippensburg,	Pa.	Fleming & Fleming.
Reeve, Alfred Warfield,	Elmer,	N. J.	Jos. M. Garrison, Jr.
Reice, Isaac Stephen,	Bloomsburg,	Pa.	Moyer Brothers.
Rhodes, Geo. Washington,	Newark,	Del.	Dr. J. B. Butler.
Robinson, David Crogman,	Philadelphia,	Pa.	H. M. Minton, Ph.G.
Robinson, Thomas Holmes, Jr.,	Bealeton,	Va.	L. F. Ringer.
Roeder, Morris Albert,	Schuylkill Haven,	Pa.	Dr. A. A. G. Stark.
Roessler, Harry L.,	Philadelphia,	Pa.	Harry A. Smith.
Rudolph, Harold Clarence,	Pottsville,	Pa.	John P. Frey.
Schiesser, Harry William,	Philadelphia,	Pa.	
Scott, Walter Edward,	Pomeroy,	Pa.	Jas. Grier Long.

Name.	*Place.*	*State.*	*Preceptor.*
Seal, John Horace,	Swarthmore,	Pa.	A. R. Morton, M.D.
Seeley, Chester Belting,	Bridgeton,	N. J.	G. H. Whipple & Son.
Shaw, Saml. Frederick,	Philadelphia,	Pa.	Geo. B. Evans.
Shaw, Wm.,	St. Louis,	Mo.	
Slobig, Charles Henry,	Reading,	Pa.	R. J. Williams.
Smith, Harry Wm.,	Pottstown,	Pa.	E. S. Beshore.
Smith, Karl Walter,	Marietta,	Pa.	R. W. Cuthbert.
Smith, Wm. David Harris,	Jonesboro,	Tenn.	E. B. Jones.
Soken, Joseph Louis,	Zitsmir,	Russia.	Geo. Seldes.
Strauss, Robert Franklin,	Womelsdorf,	Pa.	F. T. Landis.
Stuver, Henry Wm.,	Fort Collins,	Col.	A. W. Scott.
Swineford, Ernest Clarence,	Miffinburg,	Pa.	T. B. Brubaker, M.D.
Swartz, Wm. L.,	Carlisle,	Pa.	Geo. W. Sipe.
Thomas, George Carroll,	Lima,	Pa.	W. P. Wingender.
Toulson, Jno. Milbourn,	Chestertown,	Md.	M. A. Toulson.
Trost, Wm. Christian,	Ashland,	Pa.	A. Schoenenbergh.
Tyler, Ephraim Shaw,	Bridgeton,	N. J.	W. A. Rumsey.
Ulrich, Ralph Thomas,	Manheim,	Pa.	Dr. E. E. Gibble.
Waldenberger, William,	Manayunk,	Pa.	Louis Waldenberger
Walther, Phillip,	Meadville,	Pa.	V. W. Eiler.
Weidemann, George Buzby,	Philadelphia,	Pa.	Dr. C. A. Weidemann.
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Welch, William Herbert,	Frankford, Phila.,	Pa.	M. J. Wilson, M.D.
Williams, Morrison Patton,	Charlotte,	N. C.	Shinn & Baer.
Wilson, Oscar Herman,	Frankford, Phila.,	Pa.	R. J. Siegfried.
Winkler, Max Edwin,	Philadelphia,	Pa.	O. C. Winkler.
Winstanley, John,	Germantown, Phila.,	Pa.	B. A. Wissler.
Wisegarver, Oscar Kline,	Quarryville,	Pa.	T. M. Rohrer, M.D.
Wollaston, Byron Parker,	Wayne,	Pa.	H. C. Hadley.
Woodill, Robt. Franklin,	Philadelphia,	Pa.	Chas. E. Keeler.
Worthington, Warren W.,	Philadelphia,	Pa.	Chas. H. Clark.
Ziegler, Chas. Norman,	Gettysburg,	Pa.	Lewis Genois.
Ziegler, Wm. Lodge,	Steelton,	Pa.	W. L. Ziegler.

THIRD YEAR CLASS LIST.

Name.	*Place.*	*State.*	*Preceptor.*
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Barnett, Eldredge Ewing,	Cape May City,	N. J.	D. C. Guthrie.
Bell, Robert Nevens,	Kearney,	Neb.	S. A. D. Henline.
Bender, Arthur Clarence,	Shenandoah,	Iowa.	D. Ford Barr.
Benner, Fredk. James,	Bethlehem,	Pa.	Paul Kempsmith.
Boesch, Theodore Karl,	York,	Pa.	A. H. Lafean & Bro.
Boltz, Paul Kline,	Lebanon,	Pa.	E. K. Boltz.
Bosler, Harry Ellis,	Olean,	N. Y.	J. C. Welch.
Boysen, Theophilus H., Jr.,	Egg Harbor,	N. J.	Dr. T. H. Boysen.
Branin, Manlif Lewis,	Millville,	N. J.	C. B. McLaughlin.
Brenner, Frederic A.,	Kylertown,	Pa.	Lawson C. Funk.
Buckman, William Watson,	Newtown,	Pa.	Harry Cox.
Cather, Frank L.,	Chester,	Pa.	L. J. Farley.
Collins, Lane Verlenden,	Gloucester,	N. J.	John A. Frey.
Cone, Earl Hobart,	Batavia,	N. Y.	W. S. & J. J. Patterson.
Converse, Howard R.,	Picture Rocks,	Pa.	Moyer Brothers.
Davis, William Brown,	Kingston,	Pa.	W. H. Breisch.
Doan, Chester Clayton,	Coatesville,	Pa.	W. E. Lee.
Dunn, Edwin Alfred,	Meadville,	Pa.	P. H. Utech.
Eckels, Paul,	Decatur,	Ill.	C. A. Eccles.

Name.	Place.	State.	Preceptor.
Eddy, Roswell Martin,	Philadelphia,	Pa.	H. C. Eddy.
Eppler, George Theodore,	Philadelphia,	Pa.	E. E. Wilson.
Fegley, Florence Augusta,	Allentown,	Pa.	Fegley Bros.
Fegley, John Stauffer,	Allentown,	Pa.	Fegley Bros.
Fischer, Adolph Gustav,	Philadelphia,	Pa.	Albert Oetinger.
Fisher, George Calvin,	Philadelphia,	Pa.	E. K. Fisher.
Fleming, Samuel Clarkson,	Philadelphia,	Pa.	J. C. Perry.
French, Rolland Hall,	Salem,	Ohio.	Bolger & French.
Garber, Elmer Franklin W.,	Mt. Joy,	Pa.	Howard Smoker.
Gleim, Harry Charles,	Hazleton,	Pa.	McNair & Hoagland.
Goodyear, Harry Jacob,	Cornwall,	Pa.	L. Lemberger & Co.
Graham, Willard Rice,	Philadelphia,	Pa.	Smith, Kline & French Co.
Harbord, Kittie Walker,	Salem,	Ore.	Danl. J. Fry.
Harris, Wm. K. Garfield,	Altoona,	Pa.	A. F. Shimberg.
Hassinger, Samuel Reed,	Philadelphia,	Pa.	S. E. R. Hassinger.
Haydock, Mabelle,	Philadelphia,	Pa.	Susanna G. Haydock.
Headings, Prestie Milroy,	Reedsville,	Pa.	J. C. Perry.
Highfield, Herbert Monroe,	Zanesville,	Ohio.	Bailey Drug Co.
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Houston, Franklin Paxson,	Philadelphia,	Pa.	R. T. Young.
Hubler, Guy Garfield,	Gordon,	Pa.	J. E. Gregory.
Jetton, James Stuart,	Dyer,	Tenn.	Hayes & Griggsby.
Klopp, Edward Jonathan,	Reading,	Pa.	H. C. Blair.
Knerr, Charles George,	Allentown,	Pa.	G. W. Shoemaker & Co.
Kraus, Otto Louis,	New Haven,	Conn.	Otto Kraus.
Lacy, Burdet Seldon,	Philadelphia,	Pa.	Harry Cox.
Leib, Wilbur John,	York,	Pa.	John P. Frey.
Leiby, Howard Edward,	Ashfield,	Pa.	F. G. Mumma.
Levering, John H.,	Norristown,	Pa.	Eugene Fillman.
Lewis, Fielding Otis,	Hebbardsville,	Ky.	R. M. McFarland.
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Luddy, James D.,	Chestnut Hill, Phila.,	Pa.	F. P. Streeper.
McClintock, Geo. Washington,	Key West,	Fla.	H. C. Blair.
McClurg, Benjamin Hoffer,	Elizabethtown,	Pa.	Alfred H. Bolton.
McDermott, Rob't Joseph,	Trenton,	N. J.	A. S. Wickham.
McFadden, Warren Lester,	Williamsport,	Pa.	Duble & Cornell.
MacPhee, John James,	Glasgow,	Nova Scotia.	F. D. MacPhee.
Mauger, Harry Filman,	Pottstown,	Pa.	J. D. Seiberling.
Metcalfe, Hiram Kennedy,	Greencastle,	Pa.	Sands Drug Co.
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Musser, Guy Musselman,	Witmer,	Pa.	R. W. Cuthbert, Ph.G.
Nauss, George Hill,	Steelton,	Pa.	W. K. Martz.
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Pollins, Harry George L.,	Greensburg,	Pa.	S. P. Brown.
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Raser, Wm. Heyl,	Reading,	Pa.	John B. Raser.
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Rhoads, Luther K.,	Reading,	Pa.	C. H. Randenbush.
Rinker, William,	Hellertown,	Pa.	F. E. Jacobson.
Roberts, Geo. William,	Philadelphia,	Pa.	Dr. J. L. Sands.
Rogers, Walter Clyde,	West Chester,	Pa.	Frank P. Rogers.
Ryan, Thomas A.,	Susquehanna,	Pa.	Dr. W. S. Mitchell.
St. Jacques, Gaston,	St. Hyacinthe,	Canada.	Dr. E. St. Jacques.
Saul, Irvin Ellsworth,	Windsor Castle,	Pa.	Jesse W. Pechin.
Schmerker, Adolph Alex. B.,	Allentown,	Pa.	J. L. Crothers.

Name.	*Place.*	*State.*	*Preceptor.*
Schneider, Emil Sebastian,	Philadelphia,	Pa.	Philip Goll.
Schooley, Joseph Griggs,	Montgomery,	Pa.	T. W. Strank.
Scott, Henry William,	Waynesburg,	Pa.	Dr. Brock.
Shafer, Clarence Eugene,	Altoona,	Pa.	H. L. Stiles.
Shannon, Byron Guest,	Philadelphia,	Pa.	A. C. Schofield.
Shaver, David Oscar,	Altoona,	Pa.	F. L. Akers.
Sheffer, William Walter,	Dillsburg,	Pa.	Lawson C. Funk.
Shenkle, Albert Philip,	Phœnixville,	Pa.	M. R. Shenkle.
Shields, Percy Way,	West Chester,	Pa.	W. W. Bowman.
Skillman, Lionel Gilliland,	Philadelphia,	Pa.	Shoemaker & Busch.
Slocum, Chas. Eben,	Ouray,	Col.	C. C. Stratton.
Spears, Edward Gibson,	Reading,	Pa.	Harry H. Kline.
Steever, Wm. Forsaith,	Millersburg,	Pa.	C. E. Steever.
Stoudt, Irwin Sylvester,	Obold,	Pa.	Wm. Proctor, Jr., Co.
Stout, Benjamin Franklin,	Quakertown,	Pa.	N. S. Steltzer.
Strathie, Alex. John,	Sussex,	England.	Wm. J. Jenks.
Texter, Charles Henry,	Perkasie,	Pa.	Harry Neamand.
Tingle, John Beard,	Dayton,	Ohio.	E. M. Boring.
Urffer, Samuel,	South Bethlehem,	Pa.	H. W. Sheets.
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Wolfinger, John Philip,	Reading,	Pa.	H. J. Schad.
Ziegler, C. Harry,	York,	Pa.	Nelson B. Fry.

SPECIAL STUDENTS.

Name.	*Place.*	*State.*	*Department.*
Andrews, W. C.,	Woodstown,	N. J.	Chemistry.
Boss, A. C.,	Philadelphia,	Pa.	Chemistry.
Capwell, H. M.,	Philadelphia,	Pa.	Chemistry.
Carter, F. P.,	Philadelphia,	Pa.	Chemistry.
Cavanaugh, F. A.,	Ashbourne,	Pa.	Chemistry.
Cone, Earl Hobart,	Batavia,	N. Y.	Chemistry.
Cooney, Wm. Francis,	Florence,	Mass.	Chemistry.
Crawford, W. H., Jr.,	Ashbourne,	Pa.	Chemistry.
Dubbs, Carbon P.,	Pittsburg,	Pa.	Chemistry.
Ehman, J. W.,	Philadelphia,	Pa.	Chemistry.
Everham, Harry V.,	Ambler,	Pa.	Chemistry.
French, Rolland Hall,	Salem,	Ohio.	Chemistry.
Gagan, George,	Wilmington,	Del.	Chemistry.
Hoffman, N. B.,	Fairview,	Pa.	Chemistry.
Jaeger, W. C.,	Philadelphia,	Pa.	Chemistry.
Kane, J. K.,	Brooklyn,	N. Y.	Chemistry.
Lord, Geo. W., Jr.,	Haddonfield,	N. J.	Chemistry.
McMahon, Joseph Alphonsus,	Lock Haven,	Pa.	Chemistry.
Michels, V. C.,	Albion,	Ill.	Chemistry.
Pitts, M. W.,	Lynn,	Mass.	Chemistry.
Roberts, John Austin,	Wilmington,	Del.	Chemistry.
Staley, F. W.,	Middletown,	Pa.	Chemistry.
Stolz, Louis,	Syracuse,	N. Y.	Chemistry.
Suess, Ignatz,	Gr. Meseritch,	Austria.	Chemistry.
Smith, F. D. G., Ph.G.,	Grand Fords,	N. D.	Chemistry.
Thompson, Samuel,	Germantown, Phila.,	Pa.	Chemistry.
Walker, J. T.,	Bridgeport,	Pa.	Chemistry.
Whitaker, W. E.,	Frankford,	Pa.	Chemistry.
Winters, O. E.,	Germantown, Phila.,	Pa.	Chemistry.

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FEBRUARY, 1901.

THE CHEMISTRY OF IPECACUANHA.

By Dr. B. H. Paul and A. J. Cownley.

Ipecacuanha is probably, next to opium and cinchona bark, one of the most important drugs in the official materia medica. Its chemical history, however, has been for a long time very imperfect, and although some of its medicinal effects have been ascribed to the presence of an alkaloid, there has been hitherto considerable doubt whether that was always the case. In prosecuting an inquiry as to the amount and nature of the alkaloid in ipecacuanha to which the name emetine has been given, reference was, of course, made to the observations of previous experimenters. Instead, however, of deriving much assistance from the statements of their results, we found that they led to considerable uncertainty respecting the chemical identity of the alkaloid described as emetine.

The investigation of ipecacuanha from a chemical point of view was first undertaken by Pelletier,[1] shortly after Sertürner's discovery of morphine. Pelletier showed that the medicinal properties of the drug were due to a "proximate principle or matière vomitive," to which he gave the name of Emetine, from ἐμέω to vomit. A formula for its preparation was introduced into the French Codex in 1818.[2] The product so obtained—amounting to 16 per cent. of the drug—was little more than a concentrated alcoholic extract. It had the form of transparent scales of a reddish-brown color, acid reaction and bitter taste, was very deliquescent, soluble in all propor-

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[1] *Annales de Chim. et de Phys.*, IV, 172, and *Journ. de Pharm.*, 2, III, 145; IV, 322, 1817.

[2] Codex Med., 1818, 179.

tions in water or alcohol, but insoluble in ether. The aqueous solution gave a green color with ferric salts and copious flocculent precipitates on the addition of basic lead acetate or infusion of nutgalls. It was, in fact, a pharmaceutical preparation rather than a distinct chemical substance, and was essentially a compound of the basic constituents of ipecacuanha with a substance somewhat analogous to tannin.

Subsequently Pelletier succeeded, in conjunction with Magendie, in obtaining a product of distinctly basic character, which was submitted to analysis by Dumas[1] and its composition was represented as corresponding with the formula $C_{15}H_{24}NO_4$.

	Found.	Calculated.
C	64·57	64·24
H	7·77	8·39
N	4·30	4·96
O	22·95	22·61
	99·59	100·20

This base was described as a white pulverulent substance somewhat yellowish and becoming colored on exposure, but not deliquescent. It melted about 50° C., was very slightly soluble in cold water, freely soluble in alcohol and insoluble in ether.

It had a marked alkaline reaction and neutralized acids, but apparently did not form crystallizable salts, though "acid solutions sometimes showed signs of crystals." An aqueous solution was not precipitated by basic lead acetate. It was, therefore, very different from the emetine of the French Codex, and Magendie found it to be three times as effective medicinally.

Various methods of preparing emetine were subsequently suggested by Calloud, Merck, Reich and Leprat, but none of them furnished a perfectly pure and chemically individual substance. The examination of the alkaloid obtained from the official Brazilian ipecacuanha by Reich[2] is chiefly noticeable for the results of the elementary analysis leading to the formula $C_{20}H_{30}N_2O_5$:

	Found.	Calculated.
C	63·114	63·49
H	7·991	7·93
N	6·109	7·40
O	22·786	21·18
	100·	100·

[1] *Ann. de Chim. Phys.*, 2, XXIV, 180.

[2] 1863. *Archiv der Pharm.*, 2, 113, 193.

The ipecacuanha then employed for medicinal purposes in France was probably the officially recognized drug imported from Brazil, under the name of Rio ipecacuanha, the product of a plant belonging to the genus Cephaelis, and growing in the province of Mato Grosso, situated in the basin of the river Paraguay.[1] The Codex of 1758 enumerated three kinds of the official drug[2]—ipecacuanha fusca, ipecacuanha cineriia and ipecacuanha candidior—which would probably correspond with the three varieties, brown, gray and white, mentioned by Pelletier in his memoir as being the kinds most used.[3] The botanical source of these varieties is uncertain, for Pelletier's statement that the brown ipecacuanha examined by him was the product of *Psychotria emetica* was subsequently corrected by Guibourt.[4] In addition to the varieties attributed to the genus *Cephaelis*, two other kinds of ipecacuanha appear to have been official at that time, the "striated"[5] and "undulated."[6] Other kinds of ipecacuanha were imported from Para and Bahia, under names taken from the provinces of Brazil whence they were collected. Some of them no doubt were derived from plants of the genus Cephaelis and others from species of Ionidium, etc.

The gradually increasing scarcity and high price of the Brazilian drug, as well as the success attending the importation of cinchona bark from New Granada, subsequently led to the introduction of a drug from that part of South America, under the name of Carthagena ipecacuanha, obtained from a plant growing in great abundance on the banks of the Magdalena River, and considered by Guibourt to be a different and botanically undetermined species of *Cephaelis*.[7] In 1869 Lefort directed attention to this drug,[8] pointing out that, although differing in appearance from Brazilian ipecacuanha, it might be equally useful medicinally, and could, in that case, be recognized officially as a valuable supplement to the Brazilian drug. But before its use in pharmacy could be adopted,

[1] See Weddell, *Ann. des Sciences Naturelles*, II, 193.

[2] Codex Med., 1758, p. 63.

[3] *Journ. de Pharm.*, III, 148.

[4] Guibourt, "Histoire abrègé des Drogues Simples." Second edition. I, 298.

[5] Described by Guibourt as *Radix Psychotriæ. Ibid.*, p. 301.

[6] Referred by Guibourt to a species of *Richardsonia. Ibid.*, p. 302.

[7] "Histoire Naturelle des Drogues Simples," III, 82, 1850.

[8] Carthagena ipecacuanha was imported into France in boxes or casks by way of Havre, while the Brazilian drug was imported in serons by way of Bordeaux.

better knowledge was requisite as to its components, and of its actual behavior to the official drug as a therapeutic agent. Lefort,[1] in order to solve that problem, and with the view of definitely settling the question whether the ipecacuanha of New Granada could be substituted for the official drug, made a comparative examination of the two kinds by determining the amount of alkaloid contained in them.

Lefort had recourse to the method suggested by the observations of Pelletier and Dumas that the alkaloid of ipecacuanha formed with tannin a compound characterized by its very sparing solubility in water. The powdered drug was extracted by strong and weak alcohol successively; the alcoholic liquor evaporated to a syrup and the residue mixed with a large quantity of water. Tannin in slight excess was then added to the filtered liquid and the precipitate so produced well washed, dried and weighed. In that way Lefort arrived at the conclusion that the ipecacuanha of New Granada contained rather less alkaloid than that of Brazil, the relative amounts of tannate obtained being 1·34 and 1·44 per cent. Another method adopted for comparing the two kinds of ipecacuanha as to their contents in alkaloid was based on the sparing solubility of the nitrate of the base in water. The results thus obtained were very similar, so far as the amount of alkaloid was concerned; but Lefort too readily assumed the chemical identity of the basic constituents of the two different kinds of ipecacuanha. In a subsequent memoir, published during the same year, Lefort gave the results of a more particular study of the properties and composition of the alkaloid obtained from ipecacuanha.[2] The method then adopted for its extraction consisted in treating the syrupy residue of an alcoholic extract with caustic potash and chloroform. A product was obtained from the chloroform solution consisting chiefly of a base mixed with a resinous substance. These were separated by treatment with a very dilute acid, and, by adding to the clear solution just enough ammonia, the base was precipitated almost free from the resinous substance, the last portion of which was removed by digesting the washed and dried precipitate with ether. The base thus obtained was a very light powder of a white or gray

[1] *Journ. de Pharm. et de Chimie*, 4, IX, 167.
[2] *Journ. de Pharm. et de Chimie*, 4, IX, 241.

color, according to the degree of purity, almost inodorous and of bitter taste. It melted at 70° C. and on exposure acquired a brownish color, but did not deliquesce. It was sparingly soluble in cold water—1 : 1,000—readily soluble in alcohol and in chloroform, but very slightly soluble in ether, and it was uncrystallizable. That base was readily dissolved by caustic potash or soda and the solutions rapidly absorbed oxygen from the atmosphere. It was less freely soluble in ammonia, and when mixed with lime or magnesia it became yellow on exposure to air. It was readily dissolved by most acids, neutralizing them and forming soluble uncrystallizable salts; with nitric acid it formed a very slightly soluble salt and this was considered to be the most distinctive characteristic of the base. Potassium iodide and alcoholic solution of iodine gave precipitates which were very sparingly soluble in water. Mercuric chloride and potassium mercuric iodide gave white precipitates insoluble in water and soluble in alcohol. The platinochloride was soluble in water, but only sparingly soluble in alcohol, whilst ammonium molybdate and basic lead acetate both gave precipitates. Lefort did not analyze the base so obtained; but with the aid of the analytical data given by Pelletier and Dumas he endeavored to ascertain its molecular weight from the saturating capacity and the composition of its salts by determining the amounts of combined acids in the neutral sulphate and hydrochloride. On that basis, and assuming the alkaloid to be identical with the substance analyzed by Dumas, it was inferred that its formula was $C_{30}H_{44}N_2O_8$.

	Calculated.	Found.
C	64·28	64·57
H	7·86	7·77
N	5·00	4·30
O	22·85	22·95
	99·99	99·59

The subject was next taken up by Glènard,[1] who applied the method of treatment with lime and ether for extraction of the alkaloid, obtaining it colorless and in relatively large amount, a result that was not consistent with the description of emetine then accepted. Glènard obtained the alkaloid by mixing a dry alcoholic extract of ipecacuanha with an equal quantity of water and one and

[1] "Recherches sur l'alcaloide de l'ipécacuanha," *Ann. de Chim. et de Phys.*, 5, VIII, 233

one-half times its weight of lime, then percolating the mixture with hot ether in the proportion of 1 litre of ether to 100 grammes of the extract. That ethereal solution was then shaken with sufficient weak hydrochloric acid to form a salt and, after separating the ether, the base was precipitated from the aqueous solution by ammonia. By careful evaporation of an aqueous solution of the hydrochloride the salt was obtained in a crystalline form. That result—contrary to the experience of Lefort and others, that all the salts of emetine were uncrystallizable—enabled Glènard, by repeated crystallization, to prepare a product of greater purity than had hitherto been obtained. Analysis of the purified base gave results very different from those obtained by Dumas, as shown below:

	Glènard.		Dumas.
C	72·43	72·08	64·57
H	8·64	8·59	4·30
N	5·28	5·42	7·77
O	13·65	13·91	22·95
	100·	100·	99·59

Glènard's data leading to the formula $C_{15}H_{22}NO_2$ were further confirmed by the analysis of the crystalline hydrochloride.

	Found.	Calculated for $C_{15}H_{22}NO_2,HCl$.
C	63·00	63·26
H	8·15	8·08
N	4·75	4·92
O	11·64	11·24
Cl	12·46	12·47

From these results Glènard was led to the conclusion that the substance analyzed by Dumas, as well as that subsequently obtained by Lefort, could not have been sufficiently purified.

As a result of the question raised by Glènard as to the purity and individuality of the substance obtained by previous experimenters, a further paper was published by Lefort and Wurtz[1] in which they suggested a method of preparing emetine by mixing an aqueous solution of the alcoholic extract of ipecacuanha with a saturated solution of potassium nitrate. The washed precipitate of the nitrate which required 100 parts of water for solution was dissolved in hot

[1] "Memoire sur la Preparation et la Composition de l'Émétine," *Ann. Chim. Phys.*, 5, VIII, 277.

alcohol mixed with lime and, after evaporating off the alcohol, the dry residue was extracted with ether. The base was then further purified until almost colorless and it was then assumed to be absolutely pure. Analysis corresponded with the formula $C_{28}H_{40}N_2O_5$.

	Found.			Calculated.
	1	2	3	
C	69·79	69·47	69·01	69·42
H	8·15	8·18	8·14	8·27
N	5·15	5·84	5·49	5·78
O	16·30	16·51	17·36	16·53

In further confirmation of that formula, an analysis of the nitrate showed that its composition was represented by the formula $C_{28}H_{40}$-$N_2O_5,2NO_3H$.

Whatever may have been the chemical character of the substances subjected to analysis for the purpose of the investigations already referred to, there can be little doubt that commercial emetine was impure and sometimes contaminated with a considerable amount of resin or of the constituent of ipecacuanha which to some extent resembles tannin.

Podwyssotzki,[1] who pointed out that fact, proposed to remove the impurity by means of ferric chloride. The product thus obtained was snow white, it melted at 62°–65° C., had a strongly alkaline reaction, was readily soluble in ether and very sparingly soluble in water. By the slow evaporation of an ether solution of the base partial crystallization occurred, but none of the salts were obtained in a crystalline form. The base was sparingly soluble in cold petroleum spirit or benzine, but easily soluble when heated, separating again, on cooling, in white flocks.

Some years after, the alkaloid of ipecacuanha was again submitted to investigation by Kunz,[2] who adopted a modified form of the method of preparation suggested by Podwyssotzki. Kunz's product was amorphous and colorless, but it rapidly became yellow on exposure. It was "by no means insoluble in caustic alkalies," very sparingly soluble in cold water, cold petroleum spirit or ether, but

[1] *Pharm. Zeits. für Russland*, XIX, 1; *Pharm. Journ.*, 3, X, 642.

[2] "Beiträge zur Kenntniss des Emetine," *Archiv der Pharm.*, XXV, 461.

more freely by heating. By rapid evaporation of a concentrated ether solution of the base distinct acicular crystals were sometimes obtained. When free from moisture or adherent petroleum ether, it melted at 68°–74° C.

The retention of minute traces of solvent was also considered to have been the cause of the differences between the analytical results of previous observers, and when that was provided against, analysis gave numbers leading to the formula $C_{30}H_{40}N_2O_5$.

In none of the memoirs above referred to is there any statement as to the kind of ipecacuanha operated on, and it was probable that some of the discrepancies they present might be ascribed to differences in the drug examined. The general probability that ipecacuanha might contain more than one alkaloid was also recognized by Glènard as well as by Lefort and Wurtz, but in neither case was any definite conclusion arrived at on that point, so that the alkaloid obtainable from ipecacuanha has hitherto been always regarded as one substance, having distinct chemical individuality.

On the contrary, we find that ipecacuanha resembles cinchona bark, a product of the same natural order, containing at least three alkaloids, and probably other alkaloids in small proportions.

Of the three alkaloids which we have isolated, one is uncrystallizable, but capable of forming salts which are crystallizable, though for the most part very freely soluble. For this base we have retained the name emetine. The second alkaloid, named cephaeline, is crystallizable, less soluble in ether than emetine, but freely soluble in alcohol or chloroform; much more soluble than emetine in hot petroleum spirit, and readily soluble in solutions of caustic alkali. The third alkaloid, termed psychotrine, has been isolated in only small quantity, and exists in the drug in very small amount, relatively, to emetine and cephaeline.

The failure of most previous observers to arrive at correct conclusions in regard to the ipecacuanha alkaloids presents some features of interest as showing how largely the results of such investigation may be influenced by accidental circumstances.

Lefort's method of extraction with chloroform in the presence of caustic potash furnished a product consisting of an uncertain mixture of all the alkaloids, and, in the absence of any ascertained distinction between them, their separation by Lefort was impossible. Therefore, the formula assigned to emetine by Lefort, on the basis of

Dumas' analysis, was necessarily inaccurate. The result arrived at by Lefort and Wurtz in their subsequent investigation was also defective for the same reason, although the mixed alkaloids were then obtained in a condition of greater freedom from impurity by extracting the drug with ether in the presence of lime.

Podwyssotzki's result obtained by employing ferric chloride to remove the tannin constituent was vitiated by using petroleum spirit for extraction. The product thus obtained was consequently an indefinite mixture of cephaeline and emetine from the action of the petroleum spirit on both the alkaloids, whilst probably the greater part of the emetine was not extracted at all. Kunz also used petroleum spirit and with a similar result, as is shown by the fact that the alkaloid obtained is described as (partially?) soluble in caustic alkalies. The formula deduced from analysis by Kunz was therefore necessarily incorrect, as the material operated upon by him must have been a mixture. The experiments made by Kunz for ascertaining the constitution of emetine were also, for the same reason, fallacious, and therefore no importance can be assigned to the conclusions that were arrived at by him. The observations of Blunt,[1] that a so-called emetine of the molecular weight 508, as assigned to it by Kunz, requires one equivalent of a dibasic acid for neutralization, do not in any way advance the chemistry of the subject, inasmuch as Glènard had already shown that pure emetine assumed to have a combining weight of 248 is monobasic; hence it naturally follows that if the base were assumed to have a combining weight twice as great it would appear to be dibasic. Blunt, like Kunz, failed to obtain emetine hydrochloride in a crystalline form, for the simple reason that both chemists were dealing with a mixture of the two bases emetine and cephaeline.

Glènard, however, was more fortunate in his investigation. That was due to the care taken in obtaining the alkaloid in the state of a crystalline neutral hydrochloride, after extraction, by treatment with lime and ether. As a consequence of adopting that method of treatment, the cephaeline was eliminated and emetine was isolated in a pure condition, as shown by the results of Glènard's analyses, which correspond very closely with our own. Indications of the existence of another alkaloid were observed by Glènard, but they were not followed up by him.

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[1] T. P. Blunt, *Pharm. Journ.*, **3**, XX, 809.

Glènard's observations have received, however, very little notice, and in most chemical books the formula assigned to emetine by Kunz has been adopted as the most satisfactory. That view, however, must now be abandoned, since the results of our investigations show that the substance to which Kunz refers could not have been a definite substance.

(*To be continued.*)

PRACTICAL POLITICS APPLIED TO PHARMACY LEGISLATION.

By J. H. Beal, Scio, O.

THE PHILADELPHIA COLLEGE OF PHARMACY THE GODMOTHER OF PHARMACY LEGISLATION IN THE UNITED STATES.

It is especially fitting that the Philadelphia College of Pharmacy should take an active part in the discussion and advocacy of pharmacy legislation, since this institution may properly be regarded as the godmother of practically all the existing pharmacy laws in the United States. Our present laws are largely built upon the American Pharmaceutical Association model of 1869, which was mainly prepared by a member of the faculty of this institution, and was discussed and approved by the College before it was presented to the Association. This model is often referred to as if it were a mere copy of the English statute of 1868, but aside from the fact that, like the English law, it sought to restrict the practice of pharmacy to registered persons, it was built upon wholly original lines, and proposed an entirely different form of machinery for carrying the law into effect.

THE AWAKENING OF PHARMACY.

It must be evident to every observer of pharmaceutical affairs that we are in the midst of an extraordinary movement that promises to place the practice of pharmacy upon an entirely different footing from that which it has hitherto occupied.

After a long lethargy, the pharmacists of the United States are apparently just awakening to the fact that collectively they are capable of exerting a tremendous force in securing for themselves a position in the social and economic scale more befitting the service they render society than they have enjoyed in the past.

Everywhere there are signs of activity among the pharmaceutical fraternity, new associations are forming, and old ones are becoming more active. Renewed interest is being taken in pressing for State and National legislation tending to relieve pharmacy from unduly burdensome taxation, and in movements tending to secure fairer and more profitable trade relations between the manufacturing and jobbing interests on the one hand and the dispensing and retail interests on the other.

THE INCREASING ACTIVITY IN PHARMACY LEGISLATION.

One of the most important features of this awakening of the pharmaceutical body politic is the gradual evolution, through the joint efforts of the courts and legislatures, of a rational system of pharmaceutical jurisprudence; one which shall protect the public interest without imposing upon the natural and constitutional rights of the pharmacist, and which shall secure to the latter the opportunity of exercising his calling with the hope of reasonable profit, without infringing upon the rights of the public.

To secure this devoutly wished-for consummation, pharmacists must be active, not passive, factors. Plato says "that the punishment which the wise suffer who refuse to take part in the government is to live under the government of worse men." The penalty imposed upon pharmacists if they fail to take a proper interest in the enactment of pharmacy legislation is that they must live under laws enacted by men much less competent than themselves to prepare such legislation.

THE OBSTACLES TO PHARMACY LEGISLATION MAINLY FROM PHARMACISTS.

While we have heard much concerning the opposition of legislators to the enactment of appropriate pharmacy laws, it is the writer's opinion, based upon actual experience in advocating measures before the General Assembly, that the prime difficulty in the way of pharmacy legislation is the active or passive opposition of pharmacists themselves.

This opposition is of three kinds:

(1) The opposition of those who, without knowing why, stupidly imagine that the law will in some way interfere with their business, or who, being conscious of their own unfitness, or that they are

conducting their business in an immoral or improper manner, are opposed to any measures which might possibly interfere with them.

(2) The opposition, or what amounts to such, of those pharmacists who insist upon extreme or radical provisions which, if inserted in the measure, would most likely secure its defeat before the assembly, or, if it should chance to be enacted, would endanger it in the courts because of its interference with constitutional provisions. The overcoming of this species of opposition, for such it is in effect, is especially difficult from the fact that it comes from those who claim to be friends of the pharmacy law and therefore entitled to especial consideration.

(3) The third obstacle is found in the great mass of druggists who are poorly informed as to the nature of the legislation which should be sought, or are indifferent to the whole subject. These, when asked, generally profess to be in favor of pharmacy legislation, but limit their efforts in this respect to criticising the measures prepared by others, and count themselves liberal supporters of a bill if they do not openly oppose it.

Thus it appears that those who advocate the reform of the pharmacy laws must first overcome the opposition of those members of their own profession who are totally opposed to such legislation, must defeat the mischievous efforts of those who are in favor of radical and impractical provisions, must be able to carry with them the dead weight of the great number who are entirely indifferent, and then must still have left sufficient energy to beat down the opposition from the extra-pharmaceutical forces which are naturally expected to array themselves against such reforms.

A PLAN OF CAMPAIGN FOR THE ENACTMENT OF A PHARMACY LAW.

It has been the writer's fortune, or misfortune, to have been engaged in advocating or opposing pharmacy legislation at every session of the legislature of his own State for the past eight or ten years. This experience has convinced him that failure to procure the enactment of desirable pharmacy laws generally results from a lack of experience on the part of the persons who are delegated to look after the interests of the measure, or from a neglect to set about the work in the thoroughgoing and systematic manner which is indispensable to the successful passage of a bill through the

legislature when any opposition is manifested. Assuming that this assemblage is more interested in practical results than in literary composition, and at the risk of being prosy, the writer will attempt to formulate a simple plan of campaign which, in his opinion, should be followed by those who attempt to procure the enactment of a pharmacy law.

LEGISLATION SHOULD BE UNDER CONTROL OF THE STATE ASSOCIATION.

Without stopping to argue the point, it is taken for granted that the State pharmaceutical association should assume the initiative, and should have full control and direction of all legislation affecting pharmacy. This organization is properly regarded as representing the best elements of the profession in the State, and as probably expressing in the measures prepared by it the consensus of opinion of the druggists of the commonwealth, and its representatives, if they proceed discreetly, will be accorded a degree of attention by legislatures and by legislative committees that individuals or local societies could not expect to receive.

AROUSING THE INTEREST OF THE STATE ASSOCIATION.

The first great effort should be to thoroughly enlist the State association in favor of the proposed measure. This can best be accomplished by calling a special session for the express purpose of considering a draft of the law, at which session all other business should be tabooed. Preferably this meeting should be held just before or just after the opening of the State legislature, in order that the measure approved by the association may be put in in time to secure a good position on the calendar.

The draft should be presented to the association by some one who has made a thorough study of its provisions, and is therefore qualified to answer the objections which will invariably be raised by those who have not studied it, and will naturally want to know why this or that provision has been inserted or omitted. Generally the association's endorsement can be obtained with very little discussion, but as the prime object of the meeting is educational, the fullest possible debate should be encouraged. The draft should be read and discussed by sections, and every person present should be invited to participate, so that every member shall go home an advocate for the bill, and prepared to meet and answer the objections which may be brought against it.

THE FORM OF LAW TO BE INTRODUCED.

If an entirely new law is to be submitted to the general assembly, it should be modelled on the lines of the draft approved by the American Pharmaceutical Association at its meeting at Richmond in 1900, and whatever changes are made in this should be inserted by a competent attorney, who has been employed to give the matter his careful attention. If this is not done, the probability is that some inconsistency will be introduced which will ruin the chances of the measure before the legislature, or render it useless if passed. Many a good measure has failed of enactment because of the presence of a single objectionable clause or phrase.

AMENDMENTS.

As amendments to a bill after it has entered upon its legislative course are almost always dangerous, and frequently fatal, it should, before its introduction, be brought as nearly as possible into the shape in which it will have the best chance of passing. Those who insist upon the insertion of radical provisions, with the argument that if the legislature does not like them they can be stricken out, should have their attention called to the fact that the amendment of a bill while in the act of going through the legislature always means delay, and more often than not it means defeat. Bills in the legislature cannot be amended with the same readiness that they can in a debating society or in a pharmaceutical association. "Referred back to committee for amendment" has been the epitaph of many a brave pharmacy bill which, if properly prepared in the first place, would have had bright prospects of enactment. All provisions likely to imperil the bill should be rigorously excluded, and if of sufficient importance may afterwards be introduced into the assembly as separate measures.

THE COMMITTEE ON LEGISLATION.

The final work of the association will be the important one of selecting the Committee on Legislation, or the committee which is to look after the interests of the bill before the legislature.

The task of this committee is one of labor and vexation, requiring rare tact and patience, eternal vigilance and unceasing industry. To such an extent does the success of the bill depend upon the personnel of the legislative committee that it would not be far from the

truth to say that its fate is settled when this committee is selected. State associations have numerous offices wherein merely ornamental members may be safely lodged, but on its legislative committee it needs its most resourceful, most energetic and most earnest men.

WORK UPON THE ABSENTEES AND NON-MEMBERS.

Immediately following the adjournment of the State meeting a circular letter should be addressed to the druggists of the State, whether members of the association or not, stating briefly what has been done and asking their co-operation in securing the passage of the bill. The principal changes proposed in the law should be explained, and care should be taken to state that the interests of those already in business will not be affected deleteriously by its enactment. The circular should be conciliatory in tone, and calculated to allay the opposition of those druggists who are always on the alert to discover evil in measures proposed by others than themselves.

SELECTING A SPONSOR FOR THE BILL.

The next important step is the selection of the proper person to introduce the bill into the general assembly. This is a matter of vital importance, since a mistake in the selection of a champion may jeopardize or even defeat the measure.

In fixing upon the proper person to introduce the bill the following considerations should be kept in mind:

He should be a man of learning and ability, popular with his associates and preferably one who has had prior legislative experience.

He should be personally interested in the bill, a believer in its merits, and willing to devote time and energy toward securing its enactment.

He should be a member of a strong delegation, *i. e.*, should be from some city or district which has a large representation in the general assembly. As a member can usually command the unanimous support of his own delegation, and as the influence of a large delegation is important, other delegations having measures to pass will be chary of opposing the pharmacy bill.

The bill should be first introduced into that branch of the general assembly which it would have the most difficulty in passing if

much opposition be manifested. This is recommended for the reason that the opposition will not at first have had time to organize their forces, and also because those who are opposed to legislative measures generally make their greatest effort when the bill is put upon its final passage. If the bill is successful in this part of its course, it will have added prestige and the advantage of being in the house of its friends when the strongest assault is made upon it.

WORK AFTER THE BILL IS INTRODUCED.

The real work of the committee on legislation begins after the bill has been introduced into the general assembly. This work is to convert a majority of the members of both houses to the belief that the bill is a clean, honest measure, that its enactment will prove a public benefit, and that it is generally desired throughout the State by those who are in the practice of pharmacy. If this impression can be made upon the minds of a majority of the assemblymen, success is assured.

It must be remembered that not one member in ten will read the bill, unless he has been specially requested to do so by some interested constituent. Most of them will rely upon the statements of those who have the bill in charge for their information as to its contents and purpose. If the measure seems to be generally popular with men in whom they have confidence, they will conclude that it is a meritorious one, and will give it their support. Otherwise they will either hold aloof from it or vote with the opposition.

Among the most efficient means of favorably influencing the members of the legislature are the following:

(1) Resolutions by local associations and the colleges. Every pharmaceutical association and every college and school of pharmacy in the State should meet and adopt resolutions in favor of the bill, and forward them to the delegation from the county or district in which the society or college is located.

(2) Personal letters from prominent pharmacists in every part of the State to the members from their respective districts, soliciting their support. Nothing is so effective with a member of the assembly as a letter, or several of them, from one or more of his constituents. It matters but little what the form of the letter is, provided it expresses the fact that its writer is in favor of the

measure and desires his representative and senator to support it. Even if the member has previously made up his mind to oppose the bill, he will oppose it less vigorously, or possibly not at all, if he receives a few letters from his constituents in its favor.

To secure those letters is really the most difficult part of the work of the committee.

The temptation is usually great to send out printed letters to the druggists throughout the State, requesting them to sign and forward the same to their members in the legislature. At the best, this plan is a waste of postage and white paper. Members of the legislature usually regard such methods as an attempt on the part of some person or committee to manufacture fictitious sentiment, and very justly consider that if their constituents do not have sufficient interest in the bill to compose a letter in its favor, they must care very little what becomes of it. The best way is for the committee on legislation to make a direct appeal to prominent pharmacists throughout the State to write to their senators and representatives. If, say, fifty such men can be induced to write to their members in the assembly, and the endorsement of the local societies and colleges has been secured, the bill, if it is a good one, is almost sure to pass.

Not only should retail pharmacists be appealed to to write such letters, but wholesalers, manufacturers, physicians, and in fact any good citizen who by virtue of his social or political position should have influence in the legislature. It is all the better if persons entirely disconnected with pharmacy can be induced to interest themselves, as this is justly regarded by the legislature as evidence of the fact that the measure is really of public interest, and not a merely selfish effort on the part of druggists to create a monopoly for themselves.

CONCILIATING THE MEDICAL PROFESSION.

If the passage of a pharmacy bill through the general assembly is to be free from hard knocks the influence of the medical profession must not be lost sight of. The members of the latter profession, by virtue of their greater activity in politics, have proportionately a much larger influence in moulding legislation than pharmacists, and there is probably not a legislature in the United States which does not contain from three or four to a dozen or more physicians. Out of courtesy to the profession, these are generally all placed on the

"Committee on Medical Colleges and Associations," to which committee all bills in any way affecting the practice of medicine, dentistry or pharmacy are usually referred. If this committee reports unanimously, or by a good majority, in favor of a pharmacy bill, it is properly regarded as a very favorable beginning, while if it reports adversely, the bill has a very small chance of ever appearing on the statute books.

This fact is argument enough for the conciliation of the medical members of the general assembly, and of their professional brethren outside, and is also a good reason why those visionary members of the pharmaceutical craft who are always anxious to insert in the pharmacy law some clause to prevent the dispensing of medicines by physicians, except in emergency, and to leave the druggist the judge of the emergency, should be promptly headed off. When a bill of this character makes its appearance in the committee room it very properly goes into the bottom drawer of the chairman's desk and stays there until the end of the session, or if it gets back from the committee room, is usually in such a mutilated condition that its framers have to look the second time to recognize it.

On the other hand, if the pharmacy bill leaves the business of the physician strictly alone, the medical committee is usually inclined to be friendly, and this friendliness can frequently be increased by promising the support of the pharmaceutical interest to any medical bills which may be pending.

THE USE OF MONEY IN THE LEGISLATURE.

According to popular repute a liberal use of money among the members of the general assembly is almost indispensable to success with any measure; but this is certainly a base and unjust slander upon a very honorable class of men. There is not a general assembly in the United States the majority of whose members are not trustworthy, patriotic citizens, earnestly desirous of enacting such measures as will be of benefit to the State. If they sometimes fail it is because they have misjudged the character of a measure and not because of corrupt principles. Doubtless there are members in every legislature who are ready to solicit and accept bribes for their votes and influence, but such men are in the minority.

In the writer's opinion, the corrupt use of money in the legislature is not only wholly unnecessary, but harmful. The men who will

accept it are generally well understood by their fellow-members, and the honesty of a bill is at once open to suspicion when such men become active in its support. They really possess very little influence beyond the partners with whom they work. No greater mistake can be made by the promoters of a bill than to secure the championship of these men. If they are willing to vote for the bill, well and good, but their active support should not be solicited, as it is more likely to injure than to benefit. If any attempt is made to extort money it should be met by the statement that the committee is without funds for this purpose. If one such demand is complied with, the recipient passes the word along to his brother pirates, and then each one will demand a share of the blood money, while if the impression is given out from the start that the committee has no money to spend, they will be spared the annoyance of having to refuse corrupt solicitations.

SUBSIDIZING THE NEWSPAPERS.

Another place where money is frequently demanded is by the newspapers. In nearly every capital city there are one or more newspapers which directly or indirectly solicit money in exchange for their support of bills before the legislature, and some of them will threaten opposition if their demands are not complied with. While this practice is little better than blackmail, it is usually justified by the journals on the ground that the writing up of a measure occasions extra expense and that it is no more than fair that the advocates of the measure should bear some of the cost. As a rule it is not advisable to pay newspapers for their support, though there may be occasions where such a course would be justified by necessity, as when some other organ has come out in opposition and by misrepresentation or misstatement of facts is liable to create a wrong impression with the public. On the whole, unless the subject is first brought into the public prints by the opposition, a newspaper discussion had better be avoided, as it may and generally does arouse antagonism without materially adding to the strength of the measure before the legislature.

THE LEGITIMATE USE OF MONEY.

While we have deprecated the use of money in the legislature or for subsidizing the press, there is, nevertheless, a legitimate place

for its use, since it is only under exceptional circumstances that a pharmacy bill can be passed without liberal expenditures for postage, circulars, attorney fees, typewriting, and the travelling and other expenses of the committee on legislation. The right sort of a committee is not liable to make any unnecessary expenditures, and should therefore be its own judge of what expenses are necessary. Its members must necessarily devote a large amount of time and effort to the work of the bill, and should not be expected to meet their own travelling and hotel bills, nor be hampered by lack of funds for correspondence and printing. After paying all of these the association will still be deeply in the debt of the committee for its sacrifice of time, patience and energy in behalf of a matter in which the whole profession is interested.

DANGER OF OVERCONFIDENCE.

A danger to be specially guarded against is overconfidence on the part of the committee. It will frequently happen that the opposition is so well concealed that it may appear as if the bill would pass by a nearly unanimous vote, but if the committee permits itself to be influenced by these appearances the chances are that it will awaken some morning and find that some sharp old campaigner has put the bill into a corner whence it cannot be extricated during the remainder of the session. The only safety lies in unremitting vigilance until the law is upon the statute books. Bills have failed, even after passing both branches of the legislature, because of a failure of the proper officers to sign the record.

RECAPITULATION.

In the foregoing the writer has endeavored to give a homely and matter-of-fact statement of his opinion as to the best method of procuring the needed reforms in pharmacy legislation, which opinion is based upon actual experience in the advocacy of measures before committees of the general assembly.

The conclusions to which we have arrived may be recapitulated as follows:

The movement for pharmacy legislation should be made by the State pharmaceutical association, since this is the organization best calculated to reach and influence the druggists in all portions of the State, and is the one whose endorsement is most effective with the legislature.

The campaign should be begun by a special meeting of the association for the purpose of thoroughly discussing a draft of the proposed law, and unifying opinion upon its sections, electing the special committee which is to look after its interests, and to provide funds for necessary expenses.

The bill should be along the lines suggested by the A.Ph.A. model, should be finally pronounced upon and put in shape by a competent attorney, and should not seek to secure special privileges to the pharmacist in opposition to the general public or to the rights of the physician.

The draft should be put in the shape in which it can reasonably be expected to pass before it is introduced into the general assembly. Those who have extreme measures to advocate should be compelled to withhold them until the principal part of the law is enacted, and then bring them in as new bills.

The special advocacy of the bill before the general assembly should be in the hands of a committee on legislation, the members of which should be specially selected because of their fitness for the work.

The bill should be introduced by a strong member of a strong delegation, because of the vote-getting influence of such delegations.

The existence of the bill and the arguments in its favor should be brought to the attention of the members of the legislature individually by the committee on legislation.

All the pharmaceutical colleges and local pharmaceutical associations should meet and adopt special resolutions in favor of the bill, which should be communicated to the legislative delegations from their respective districts.

As many as possible of the influential druggists in different parts of the State should be induced to write their senator or representative endorsing the measure.

If any demand is made for money in exchange for legislative influence the committee should reply that the measure is for the public good, and that no funds are available for such expenditures.

Newspaper discussion of the bill should not be encouraged, unless the bill is first attacked through the public prints, when a suitable reply should be made.

The committee should not permit itself to become overconfident

as to success, and should never relax its efforts until the bill has received the signatures of the officers of the last house through which it passed.

When a pharmacist produces a new formula he must expect the question, "What evidence have you that your formula will work?" and the same question may properly be asked concerning the plan proposed by the present paper. The answer is that it has had a practical trial and has been eminently successful. For years the pharmacists of Ohio tried in the usual desultory fashion to procure an amendment of their pharmacy law, meeting with worse defeat at each succeeding session of the legislature. Three years ago a new attempt was made. The program which has just been outlined was followed in detail, beginning with a special session of the State Association to consider the draft of the proposed law, and followed by constant and systematic work on the part of the committee on legislation. Not a cent of money was spent in the legislature or with the newspapers, and although the measure was more bitterly fought than any of its predecessors, it passed both branches of the General Assembly without the change of so much as a punctuation point.

From the experience gained in that and other contests, the writer is convinced that, given a good draft of a law, a good committee on legislation, and systematic work along the lines which have been indicated, a pharmacy law can be passed in any State in the Union, or at least that a failure to secure its enactment would be due to extraordinary and very unusual conditions.

THE DETECTION OF ADULTERATIONS IN DRUGS BY MEANS OF THE X-RAYS.

By M. I. Wilbert.

It is well known that different substances are more or less opaque to the X-rays. This opacity is apparently due to the difference in the atomic weight of the elements entering into the composition of the particular substance under observation. We consequently find that materials having a low atomic weight offer little or no resistance to these rays, while other articles, composed of elements of high atomic weight, are nearly, if not entirely, opaque.

If we take, for example, equal parts by weight of lithium, sodium,

calcium, iron, lead and bismuth carbonates, we will find that the first two are quite easily penetrated by these rays, the second two offer rather more resistance, while the last two are comparatively opaque. This bears out the statement made above that the transparency of a substance is closely related to its atomic weight and density.

Vegetable substances, being composed chiefly of oxygen, carbon and hydrogen, with little or no earthy materials, or elements having a high atomic weight, would of course offer little or no resistance to the X-rays, consequently we have in these rays a ready means of detecting the wilful or malicious admixture of the various substances that would ordinarily be used as adulterants, such as clay, sand or gravel.

This proposition, to use the X-rays as a means of detecting adulterations of this kind, is not by any means original. Numerous suggestions have been made from time to time, and quite a number of articles have appeared, especially in France, detailing or describing the use of these rays for detecting adulterations in different drugs and foodstuffs.

The class of drugs that are especially adapted to this examination by means of the X-rays are those that are not so well adapted for examination by means of the microscope, or whose macroscopical appearance does not give much indication of their composition, namely, such drugs as have no organized cellular structure, like the inspissated juices, gums and resins. Drugs belonging to this class usually occur in irregular masses, and very often offer considerable difficulty to the estimation of their quality.

As an illustration, we may call your attention to opium. Many and various are the substances that have been found in this drug, small stones and leaden bullets being the favorite articles used to give additional weight to this well-known drug. As another illustration we may mention asafœtida. This drug, as it occurs in this market, is always more or less adulterated with sand or clay, so much so that it is almost impossible to obtain a supply of the drug that will meet the requirements of the Pharmacopœia. An examination of some of the specimens in the College collection would indicate that this admixture of absorbent clay or sand to asafœtida has been practiced for a very long time, as all of the specimens examined were evidently adulterated in the same way. One especially,

a sample of so-called stony asafœtida, was found to consist almost entirely of solid stone, with a small quantity of gum adhering to it.

The required technique is simplicity itself. Having the necessary apparatus, all that is required is to look at the interference offered by the earthy materials as indicated on a fluorescent screen, or, if we should desire a permanent record of the examination, we simply replace the fluorescent screen with a photographic plate and give an exposure of from ten to twenty seconds. Subsequent development will show us at once whether or not any appreciable amount of foreign matter is present. By making a comparative exposure of a drug of known quality, we can estimate, roughly of course, the amount of adulteration, and at least say definitely whether or not it is better or worse than the sample, the composition of which is known. Among the drugs that have been examined for foreign matter we have found that gum-arabic, gum-senegal and manna are comparatively free from admixtures of inorganic materials. Asafœtida, as mentioned above, is constantly and grossly adulterated. Myrrh is another drug that has a more or less constant admixture of adulterating materials, not necessarily clay or sand, however, as one sample of Turkey myrrh, from the College collection, was found to be a piece of bark coated on the outside with myrrh. Of the three specimens of guaiac that were examined, one was a specimen of purified guaiac from the College collection. This seems to be free from inorganic matter. The other two specimens have a slight amount of foreign material mixed with the resin.

Several specimens of benzoin were examined; of these, one had small masses of yellow clay mixed with the drug, and another consisted largely of bark and chips of wood.

The commercial samples of aloes that were examined were all free from sand and dirt. Several old specimens, obtained from Professor Kraemer, were grossly adulterated. One specimen labelled Socotrine aloes was a flat cake and consisted largely of sand or clay that had been mixed with the melted gum. Another sample labelled caballine aloes also contained a large amount of inorganic material.

Scammony, galbanum and gamboge all seem to contain a small amount of foreign material mixed with the natural exudation of the respective plants.

In addition to their use in this connection, the X-rays would seem to offer an interesting field for application in the examination of coal, asphalt and other hydrocarbon compounds that have a more or less constant admixture of siliceous or earthy materials. In the case of these compounds they not only indicate the amount of admixture, but also give us considerable information as to the nature of the admixture and the exact location of the same.

IMPROVEMENTS IN THE REMINGTON PHARMACEUTICAL STILLS.

By J. Percy Remington, B.S.

Pharmaceutical stills have been in use for many years, some have had a short life, others have answered well the requirements of their time, and have then been superseded by those of more modern construction whose merits were at once recognized.

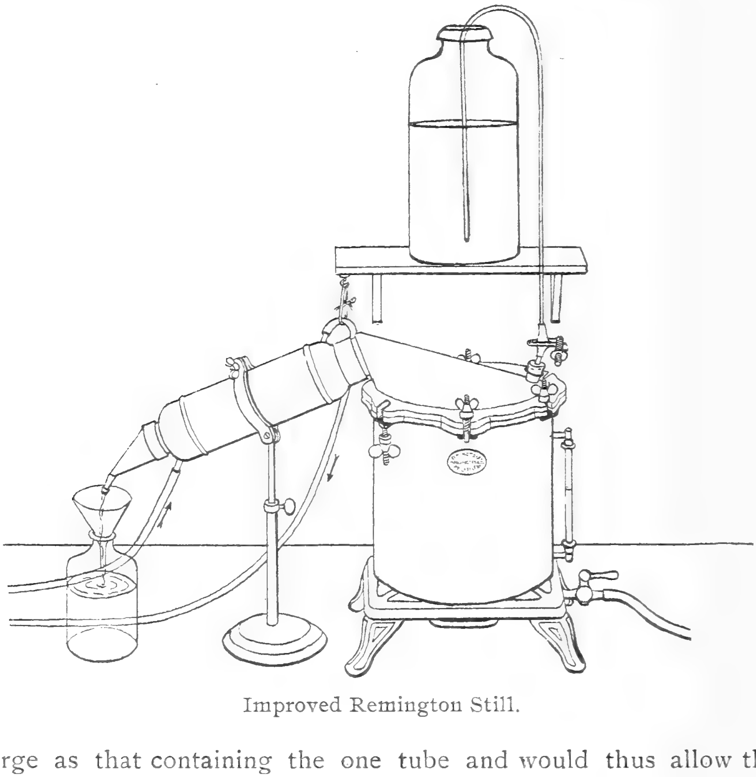
The still which is the subject of this paper was first devised by Professor Joseph P. Remington in 1872 and subsequently improved and developed as described in the American Journal of Pharmacy, 1878, page 15, and 1879, page 225. These stills have had a large use and are to be found in many parts of the world. It was with a view of introducing some further improvements that the writer took the subject up, and now ventures to present the still with the latest improvements.

The important factors in the construction of the still are that the vessel which holds the water to be distilled should present a large heating surface to the flame, that the passage from the still to the condenser should be small and direct so as to prevent any condensation at that point, and that the condenser should offer as large a cold surface to the vapor, on entering, as possible. The material of which it is composed, its strength and durability of construction, the ease with which it may be taken apart and cleaned are also important considerations.

The idea of reversing the principle of the tubular boiler and applying it to distillation as seen in the Remington condenser was a happy one. In a tubular boiler the flame circulates around the numerous tubes and evaporates the water. In this condenser the water circulates around the tubes and condenses the steam; thus the old block tin worm, which was very difficult to clean, has been

superseded by a condenser which may be thoroughly washed out by running a swab through the seven short tubes.

The fact which has often been overlooked in considering the condensation of vapors is that a tube, either straight or spiral, 10 feet long and of ½ inch inside diameter, has not the same condensing power as ten tubes, 1 foot long and ½ inch inside diameter, although both have the same extent of surface. That containing the ten tubes would present an inlet for the vapor ten times as



Improved Remington Still.

large as that containing the one tube and would thus allow the vapor to pass into and condense in the tubes that much faster. In the ten short tubes the vapor is cooled suddenly by exposure to a large cold area.

Another important point which must not be overlooked is that the two methods of distillation, by the alembic form and the retort form, are radically different in principle. In the alembic the condensation takes place in the inside surface of the head, in the retort

form all condensation should take place in the condenser and none whatever in the head, therefore the head should be small and near enough to the source of heat to get warm and thus prevent the loss due to distilled liquid dropping back into the still body. By having the outlet for the vapors at the side the condensation in the top of the Remington still is almost completely obviated.

These stills have been used for nearly twenty-eight years, and so far very little chance for improvement has been discovered. In the improved still, which is here presented, a tight joint between the still top and body is made by tightening up the thumbscrews, which are hinged to the still body. When the still is to be put away, the unscrewing of these bolts quickly effects separation.

As the condenser, when in use and full of water, is rather heavy, it was found advisable to encircle it with a clamp, which is capable of being adjusted and can be made secure at any point.

These are the only improvements that have been made in this still since it was first used. The rapidity of action of this still seems remarkable and only serves to prove the principles upon which it is built to be correct. It will distil two gallons of diluted alcohol per hour, or one gallon of water per hour, using the heat of an ordinary gas stove. It is made of tinned copper throughout, so that there is no danger of rusting, and durability is secured.

By means of the self-feeding attachment it can be run continuously, simply requiring to be looked at occasionally to see that the liquid is not getting too low.

MEMORIALS TO AMERICAN PHARMACISTS.[1]

BY DR. FR. HOFFMANN.

It has been proposed to take some appropriate action in commemoration of the semi-centennial anniversary of the American Pharmaceutical Association at the occasion of its fiftieth annual meeting to be held in Philadelphia in 1902. Among the several practical suggestions, there is, in the first place, the very proper one of having elaborated and published an historical sketch of the association, or perhaps, better, of American pharmacy and the rise and

[1] This communication, having been originally received by Albert E. Ebert, Chicago, from Dr. Hoffmann, is here presented by permission of the former.

progress of the association, including biographical notes and portraits of the principal pioneers and representatives of American pharmacy during the nineteenth century. Provided that the right man can be found to compile a worthy literary monument of this kind, such a work would be an appropriate, useful and enduring contribution to the literature of American pharmacy and a worthy credit to the association.

Precedents of this kind, although less comprehensive and specified, are the similar memoirs: "Historical Sketch of the Progress of Pharmacy in Great Britain," compiled by Jacob Bell and Theophilus Redwood, published by the Pharmaceutical Society of Great Britain at the occasion of the Fifth International Pharmaceutical Congress, held in London in 1881; "Festschrift zur Erinnerung an die 25 jährige Stiftungsfeier des Schweizerischen Apotheker Vereins am 16 und 17 August, 1893;" and "Festschrift des Deutschen Apotheker Vereins zur Feier der 25ten Jahresversammlung, 1896."

The establishment of scholarships and fellowships has also been proposed. Such endowments, however, can be of real use and benefit in a country of so vast an extent and population only if they are based upon very considerable funds, else their usefulness will be too slight and limited to far too small a number of recipients.

Another proposition seems to have been the erection of some public monument in memory of one or more of the foremost pioneers of American pharmacy. Well-founded doubts, however, may be raised whether pharmacy and its past and present position among the professions and the modern factors of intellectual culture and technical and industrial progress entitles its representatives to be ranked among the great master minds of the exact and applied sciences and arts, as well as the glorious political and military heroes whose monuments adorn the historical arenas and cities of both the old and the new world. In cases where gifted men risen from the ranks of pharmacy, such as Scheele, Liebig and others, have been honored by posterity with public monuments, this has been done in recognition of their scientific discoveries or special accomplishments only. Whether the recently erected monument of Pelletier and Caventou reflects exclusively on their scientific merits or not less on national pride also, may be a matter of doubt.

When monuments to American pharmacists are to be erected, they may more properly be placed in some museum or public hall

at the centres of education and erudition than on public squares or in parks. A proper Walhalla for the monuments of American pharmaceutical celebrities would be the hall of the pioneer school of American pharmacy, the Philadelphia College of Pharmacy, and the busts of *Procter* and *Squibb* might be among the foremost ones to be erected.

One of the most appropriate, useful and creditable memorials, however, may be the institution of a prize medal to be granted by the American Pharmaceutical Association in recognition of superior discoveries or literary accomplishments in the domains of theoretical and applied pharmaceutical sciences and arts. By bearing the impress and names of eminent and distinguished men and perpetuating their memory, this form of commemoration has been in use since antiquity. More modern memorial medals of this kind are, among others, the *Copley*, *Rumford*, *Davy*, *Hanbury*,[1] *Flückiger*[2] and *Pasteur*[3] medals, while others have been made for once only at special occasions in memory of eminent scientists and instructors, as for instance the memorial medals of Trommsdorff[4] and Scheele.[5]

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[1] The *Hanbury medal* was instituted by voluntary contributions in 1879 in memory of the distinguished British pharmacognost, Daniel Hanbury, who died in 1875. Copies of the medal in gold are granted every three years for eminent services or discoveries in the domain of pharmacognosy. The grant is made by the Presidents of the Linnean Society, the Pharmaceutical Society and the Pharmaceutical Conference of Great Britain.

[2] The *Flückiger medal* was established in 1893 in honor of the distinguished Swiss pharmacognost, Fr. A. Flückiger, at the occasion of his retirement from the professorship at the University of Strassburg. It is granted for special merits in the domains of pharmaceutical and cognate sciences and arts.

[3] The *Pasteur medal* has recently been instituted as a premium for eminent work in bacteriological research.

[4] The *Trommsdorff medal* has been coined for once only at the occasion of the fiftieth anniversary of the entrance into pharmacy of the famous pharmaceutical educator, Joh. Barthalom. Trommsdorff, in Erfurt. The medal is of bronze, showing on the front a relief bust of Trommsdorff and on the reverse a symbolic figure of Prometheus and of two youths, representing chemistry and pharmacy, with this inscription: "Pax divina coquit succos morbisque medetur."—"Tessara amicorum, 1834."

[5] The Swedish Royal Academy of Sciences had a memorial medal coined in 1790 in memory of its member Scheele; it showed a relief portrait of *Scheele* and on the reverse a symbolic representation of the discovery of oxygen, and had this inscription: "Ingenio stat sine morte decus."—"Socio prematura morte erepto Regia Academia Scientiarum Stockholmiensis."

The suggestion of establishing a *Procter-Squibb* memorial *prize medal* at the occasion of the semi-centennial anniversary of the American Pharmaceutical Association, therefore, may be worthy of consideration. Such a medal may bear on one side the relief portraits of Procter and Squibb and their names and dates of birth and death, and on the other the emblem of the association and a proper device. Both contemporaries, united in close friendship and fellowship, have been typical and eminent representatives in their special domains of application, of the prime and ideal aims and aspirations of the earlier stages of American pharmacy and the American Pharmaceutical Association. Their joint memory, therefore, may be properly linked with the fortunes and the fame of the time-honored representative association of American pharmacy.

The question may be left open whether such a prize medal may be conferred at stated intervals, or at any of the annual meetings of the association, and whether its bestowal shall be confined to Americans only.

BERLIN, December 8, 1900.

A PROCTER MEMORIAL.

BY WILBUR L. SCOVILLE.

I have been invited to offer my views as to what may best serve as a memorial to Professor Procter. It is a subject which requires much thought, for it involves the dove-tailing of two factors. A suitable memorial is, to my mind, something which will of itself recall the man whom it memorizes, and which will appeal to those whom it aims to attract. It should not only recall or stand for the man, but it should represent his character and ideals in as attractive a manner as possible, so that his endeavors may receive in

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On the occasion of an academic anniversary in 1827 another medal was coined by the academy, showing on the front Scheele's bust and on the reverse a veiled figure of Isis, whose veil Hermes tries to disclose.

When a monument was erected at the occasion of the one hundred and fiftieth anniversary of Scheele's birth in 1892, the Swedish Apothecaries' Society had an aluminum medal made showing on one side a relief bust of the Scheele Monument, with this inscription: "Carolo Guilmo Scheele, pharmaceutæ chemico grati cultores Ordo pharmaceutia Suecia." The reverse shows a relief picture of Scheele's house in Koeping and the inscription: "Domestici pariet es ipsum non famam continuerunt."

it a fresh and continuous impulse along the lines which he strove to uphold.

It is difficult to present an ideal in a way which will command attention. We do not have time to indulge much in sentiments in these days, and it is only the most vigorous and compelling endeavors that succeed in stirring up a true sentiment.

We are intensely utilitarian. The David Harum style of sentiment is the popular style to-day. An apple may be rotten throughout, but so it be gilded it is sought after. And so even the sound apple must be gilded, or it is disregarded. It's the gilding that counts and is wanted. It will not do to forget that. But how to honor the ideal and still be utilitarian is the problem. It is not a worthy memorial to gild an unworthy remembrance.

Sometimes it is wise to carry a thought or a tendency to an extreme in order to defeat it. There is sure to be a reaction. If we can put a utilitarian gilding on everything, the thoughtful ones will turn their attention to what is underneath, after a time. And so a memorial which best accedes to the demand for the serviceable now may in the end prove the best stimulus toward a worthy and honorable ideal.

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One of the greatest needs in pharmacy to-day is an established and authoritative research laboratory. I do not mean one which will delve in chemical relationships, reactions and syntheses. That is foundation work, all-important and creditable, but it is being done by the university investigators, and we can afford to leave it to them. But not all men are able to build soundly on a sound foundation. Not all can see the relationships of the seemingly abstract to the practical. There is room for a large work in the purely pharmaceutical applications of chemical facts. The pharmacists who most strongly feel the need of a sounder superstructure are not in a position to know and keep up with the increase in fundamental facts. The few who are enabled to keep in touch with the more scientific progress lack a stimulus and oftentimes an opportunity to connect them with the common needs of to-day. There is a field for the bridging of the need and the foundation fact. A laboratory in which the everyday problems of pharmacy would be worked out by competent minds and hands additional to what the

Committee of Revision of the U. S. Pharmacopœia is doing would meet a want.

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It is the custom of our larger universities to honor the memory of their scientists by naming a laboratory after them. All of our leading universities thus have one or more chemical laboratories named after one who has proved his love for chemical science by either making his influence felt in that line by his own attainments, or by buying an influence with an endowment. I do not know of any pharmaceutical laboratory thus honoring or honored. A Procter laboratory seems to me as fitting and influential a memorial as anything that could be bestowed.

By this I do not mean simply a room or building equipped and stocked and with Professor Procter's name over its doors.

The real memorial would consist in the spirit and policy within the laboratory. It should have a definite policy, with provision for carrying that policy out. And all investigations should be published as contributions from the Procter Laboratory, wherein the real memorial would appear. It would be not a local but a national memorial.

Whether the investigations should be carried on by post-graduate students through scholarships or by a director and assistants is a matter of detail; but a continuation of the work and aims of Professor Procter in this way would, it seems to me, be a fitting memorial.

BOSTON, MASS., January 3, 1901.

CORRESPONDENCE.

PROCTER MEMORIAL.

In response to a letter from the Editor of this JOURNAL concerning the most appropriate way of memorializing the life and work of Prof. William Procter, Jr., the following are some of the replies which have been received:

DEAR SIR:—In no other way than by appropriate memorials can those who live and heir the good works of those who have gone honor their names and testify to the appreciation of their worth.

And in this direction we who live to heir the works of the pharmacists who served us loyally and well can do no greater tribute than to testify to the works of Professor Procter. No more patient,

self-sacrificing, modest name appears on our records. In a neat memorial to him we will honor ourselves and credit our calling. Let it be neatly, artistically and well done.

JOHN URI LLOYD.

DEAR SIR:—Yours of December 18th was duly received. On the subject of a memorial to Prof. Wm. Procter, Jr., I am afraid I have nothing new to add to your able editorial in the November number of the AMERICAN JOURNAL OF PHARMACY. You bring out very clearly the comparative value of the different forms which such a memorial might take.

My individual opinion would be in favor of No. 2, a scholarship or a fellowship. I should like to see the American Pharmaceutical Association take hold of the matter. The honor would be reflected upon itself. While his working field was Philadelphia, his memory is a priceless one to American pharmacy.

It is not too early to canvass the matter, for we should be ready at the next annual meeting to give it specific form.

J. M. GOOD.

DEAR SIR:—As a memorial to the life and work of Professor Procter it seems to me that the endowment of a Fellowship for graduate work in pharmacy would be of the greatest benefit to the interests for which he labored and of largest advantage to the pharmacists of the United States. If such a memorial should be placed in charge of the American Pharmaceutical Association it would be in all respects a national benefaction.

ALBERT B. PRESCOTT.

DEAR SIR:—I am in receipt of your favor of the 15th inst., referring to a memorial to Professor Procter.

I would suggest a scholarship as a suitable form of memorial. When the matter is in more definite shape, we shall be pleased to have you call upon us for a contribution.

S. W. FAIRCHILD.

DEAR SIR:—I do not know what has been talked about in reference to the memorial to Professor Procter, but in view of the probability that a scholarship or any other form which would be centered in or connected with the Philadelphia College of Pharmacy would tend to sectionalize and narrow the scope of the movement, I think a bronze monument erected in a park or square in Philadelphia might be the most practical.

For myself, I would like to have the memorial a part of the College in some way, but there are many pharmacists who think the whole country has a claim on the "Father of Pharmacy" and who would be more willing to contribute to its success as a public undertaking.

You may put me down as one who will gladly do his share in a private capacity.

HORATIO N. FRASER.

DEAR SIR:—The proposal to memorialize the life and work of William Procter, Jr., meets with my hearty approval. That this should be a feature of the fiftieth anniversary of the American Pharmaceutical Association is also most appropriate. The form of memorial is not so easy to determine.

(1) My first preference would be for a bronze statue. More than anything else I know, it memorializes *the man*. Continually and perpetually it says, "Ecce Homo!" All kinds of people see it—children, youths, men, women; pharmacists, present and prospective; laborers, artisans, small traders, merchants and professional men; the rich and the poor; the heedless and the thoughtful. To all it says: "Behold a man who elevated his calling: go you and do likewise."

(2) My next preference would be for a fellowship. This should be granted each year to a graduate for the purpose of providing him the means to prosecute or continue research in some pharmaceutical subject. I can imagine some jealousies that might interfere with the raising of the necessary funds for this project, which all pharmacists would be asked to participate in, and there might be friction at times over the bestowal of the honor. If all trouble on these grounds could be avoided, this scheme would serve to revive the memory of the man whose name it would bear in a more pointed way than the other plan.

Other methods of memorializing Professor Procter have suggested themselves to my mind, but these seem the most appropriate and feasible.

W. M. SEARBY.

DEAR SIR:—Replying to yours of December 15th, I would say, let the memorial be something permanent—as a bust, a crayon portrait, an oil painting—something that will be at once an object lesson to those who shall see it and show to them that the

American Pharmaceutical Association appreciates the good work done for pharmacy by Prof. William Procter.

S. A. D. SHEPPARD.

DEAR SIR:—Your question pertains to a subject to which I have devoted but little thought, so that I scarcely know what my own opinion would be. In a general way I think the best means of honoring a man is to provide for a continuation of the work in which he was most interested. Two ways of doing this readily suggest themselves:

One is to provide a scholarship which shall involve research in the particular subject, and another to provide for an annual medal or money reward for meritorious work in the same line.

As between the two, I hardly know which I would prefer. The scholarship would probably be most productive in results, while the annual conferring of a medal would probably awaken a wider interest in the work of the person in whose name the medal was bestowed.

I am sure the services of Professor Procter merit some substantial memorial, and I trust you may be successful in your efforts in that behalf.

J. H. BEAL.

DEAR SIR:—In reply to your letter, I will say that in my opinion Professor Procter was the father of American pharmacy. I say American, for in many ways the practice of the art of pharmacy in this country is far in advance of Europe, while willing to admit the great success of the Germans in chemistry, and the dainty skill of the French; but this is wandering.

Professor Procter, while a modest citizen of Philadelphia, nevertheless was a true American, and a tribute to his memory should be something that will last. I know his writings will last and be quoted from for many generations to come. But in my mind there should be a bronze statue, life-size, erected if possible in the Congressional Library building in Washington City. It being a fireproof building, it might be considered a lasting tribute.

Yours truly,

GEO. W. SLOAN.

DEAR SIR:—Your November editorial on the Procter memorial, as well as your letter of recent date, has been carefully read and all phases of the question have been given thoughtful consideration.

A memorial in enduring bronze would be handsome, but would exert influence only in one community. A travelling fellowship would, of necessity, be of influence to individuals, for no matter how great a work would be ultimately performed by the fortunate recipients of the fellowship, the main object of the memorial—the tribute to the memory of the greatest of American pharmacists—would be obscure to public mind.

Far better would it be to conform the memorial to the ideas expressed by the A.Ph.A. Committee on U.S.P. Revision at the Baltimore meeting of 1898. Could we not erect a research laboratory for Pharmacopœial work, say, in the city of Washington, dedicated to the memory of our great pharmaceutical mentor?

An expensive undertaking, I grant you, but would it not be better to devote a large sum to a grand memorial than a smaller sum to an object of limited influence?

To establish a fellowship at the low rate of interest now prevailing, at least $15,000 would be needed. Why not double this amount and purchase and equip a building to be called the Procter Memorial Laboratory, which would be an object of as much local pride as would a bronze statue and an ever-present memorial of the great man to every pharmacist and physician in this broad land of ours? Let the running expenses be defrayed by the U.S.P. Committee on Revision, supplemented by the donation of time—say a month each year—by leading investigators of this country, many of whom I am very sure would be willing to perform such service.

Think what a glorious object-lesson in pharmaceutical progress such a memorial would be, especially if it could be operated in conjunction with the Lloyd Library. Such a combination would make America the centre of pharmaceutical thought.

H. V. Arny.

Dear Sir:—In regard to commemorating the life and work of Professor Procter I am inclined to favor the monumental form.

A monument erected to perpetuate the memory of him who has unselfishly labored for the benefit of his fellow-man, whose life has been devoted to instructing the ignorant, in aiding the weak, in recalling the erring and in raising the fallen, is an inspiration for good to all who look upon it.

The tendency, however, is to erect monuments to keep alive the memory of man's passions. War is passion, not reason. To

exalt the conqueror and to remind the vanquished is an exhibition of pride and vanity, coupled with cruelty, teaching no useful lesson, and serving no generous purpose.

Let us erect a monument to Professor Procter. To provide funds for the accomplishment of this purpose, contribution could be secured through the sale of a bronze medal fac-simile of the design of the monument on one side, a profile of the professor on the obverse.

The admirable biographical sketch of Professor Procter prepared by Professor Remington and read before the Richmond meeting of the A.Ph.A. ought to be in the hands of every pharmacist in the country. The above suggestion, if carried out, would excite more general interest and popularize the project.

J. F. PATTON.

WARBURG'S TINCTURE.

To the Editor of the AMERICAN JOURNAL OF PHARMACY.

SIR:—I notice in your December issue an article by Mr. F. A. Sieker on Warburg's Tincture. May I be allowed to point out that both his formula and that of the National Formulary are defective in that they do not contain, or make any mention of, one constituent, which was in the formula published by Professor Maclean on behalf of Dr. Warburg in the *Lancet*, Vol. II, 1875, p. 716, and copied into the *Pharmaceutical Journal*, November 20, 1875, p. 419, that is, "Confectio Damocratis?" There should be the same quantity of this added as of rhubarb. Democrates' Confection is an obsolete preparation, which in the London Pharmacopœia, 1746, contained forty-two ingredients, including the "bellies of scinks," etc. It is the old Mithridate, and is represented by Confectio Opii, B.P., 1885. But in leaving this out, the opium—"Opii Colati"—which, it is true, is only a small quantity, about one in 200 of the confection, has been omitted also in the American publications. I have been in the habit of adding four of the essential ingredients of this confection in making my preparation. These are, in addition to opium, black pepper, ginger and cinnamon. I append my working formula. There is also half the quantity of prepared chalk that there is of rhubarb in the original formula; this is added to the ingredients, which are to be pressed, and, I assume, strained before the addition of the quinine sulphate, else it might decompose the salt, and interfere with the

solubility of the quinine alkaloid in the resultant tincture. Still, I would add it, as there is a reason given for its presence in the formula, that it corrects "the otherwise extremely acrid taste of the tincture."

I have seen bottles of the tincture, that were prepared under the direction of the late Dr. Warburg, which were free from sediment, and must necessarily have been filtered at last. Mr. Sieker says the quantity of myrrh ordered in the National Formulary contains "about thirteen times as much myrrh as the original;" this is incorrect. The original formula, to which I have referred, did not contain "electuary of myrrh," but "myrrh elect," that is, "picked myrrh." The preparation, as used in England, I think is always prescribed with the aloes. What its merits are due to besides quinine, I cannot say, but I have known cases in which it produced a marvellous effect, far beyond that of an equivalent dose of quinine. The dose is 1 to 4 drachms, but in India it is given more heroically. There, Professor Maclean says: "The tincture is administered in the following manner: ½ ounce (half of a bottle) is given alone without dilution, after the bowels have been evacuated by any convenient purgative, all drink being withheld; in three hours the other half of the bottle is administered in the same way. Soon afterwards, particularly in hot climates, profuse, but seldom exhausting, perspiration is produced; this has a strong aromatic odor, which I have often detected about the patient and his room on the following day. With this there is a rapid decline of temperature, immediate abatement of the frontal headache—in a word, complete defervescence, and it seldom happens that a second bottle is required. If so, the dose must be repeated as above. In very adynamic cases, if the sweating threatens to prove exhausting, nourishment in the shape of beef tea, with the addition of Liebig's extract, and some wine or brandy of good quality may be required."

Yours obediently,

Dec. 17, 1900. WM. MARTINDALE, F.L.S., F.C.S.

TINCTURA ANTI-PERIODICA—WARBURG'S TINCTURE.

	Grains.
Socotrine aloes, bruised	240
Rhubarb, bruised	80
Angelica fruit, bruised	80
Elecampane root, bruised	40
Saffron	40

	Grains.
Fennel, bruised	40
Prepared chalk	40
Gentian, bruised	20
Zedoary root, bruised	20
Cubebs, bruised	20
Myrrh, elect and bruised	20
White agaric, powdered	20
Opium, in powder	2½
Black pepper, bruised	4
Cinnamon, bruised	8
Ginger, bruised	8
Proof spirit (specific gravity 0·920)	1 pint (20 ounces) or q. s.

Macerate for seven days, press and strain.

Dissolve in the product:

	Grains.
Quinine sulphate	175
Camphor	20

After three days filter and add sufficient proof spirit to make one pint.

Dose: 1 to 4 drachms. W. M.

RECENT LITERATURE RELATING TO PHARMACY.

SELENIFEROUS SULPHURIC ACID.

Most of the acid furnished the University of Nancy was found to contain selenium, which is easily detected by warming on water-bath five or six drops of the suspected acid with a trace of codeine, when green-blue color is produced if selenium is present.—Schlagdenhauffen and Page, *J. Ph. et Ch.*, 1900, 261.

H. V. Arny.

VOLUMETRIC ALKALOID ESTIMATIONS.

O'Linde has published in *Archiv der Pharmazie*, 1900, 102 to 135, an elaborate paper on the subject which is worthy of translation in full, as its bibliography is strikingly complete. The original work is chiefly devoted to the indicators in the alkalimetric estimation and he places order of delicacy in aqueous solvent as follows: Luteol, pernambuco-wood tincture, hæmatoxylin, logwood tincture, tincture of cochineal, brasilin, azolitmin, tincture of litmus, phenacetolin, phenolphtalein, rosolic acid, lacmoid, etc. He finds the delicacy is sometimes influenced by change in solvent and by other factors, the conclusions being:

(1) That no more indicator should be employed than is absolutely necessary.

(2) The quantity of liquid in which the alkaloid is dissolved should be as small as possible.

(3) The temperature of titration should not exceed that of the atmosphere.

(4) The most favorable condition of solution for titration with each of the several indicators is as follows:

Tincture of pernambuco-wood, tincture logwood, hæmatoxylin, brasilin, azolitmin, tincture litmus, phenolphtalein and rosolic acid with water alone, chloroform and ether to be particularly avoided with last two; fluorescein and gallein with water and ethereal layer containing the alkaloids; luteol in water or alcohol, chloroform and ether being avoided. Tincture of curcuma and poirroir blue have been suggested as indicators, but both are worthless. H. V. A.

ESTIMATION OF TOTAL SOLIDS IN URINE.

This estimation is difficult, for evaporation, even on water-bath, causes decomposition of urea, and erroneous results in consequence; and evaporation in vacuo is convenient only to expert chemists; hence calculations based on the density of the urine have been employed, the best known being the method of Haeser, who multiplies the two figures representing hundredths and thousandths of specific gravity by a constant coefficient 2·33, the product being grammes of solids in a litre of urine. Thus, specific gravity 1·020 would show: 20 x 2·33 equals 46·6 grammes solids to litre.

J. Amann (*Schw. Wochsch. f. Ch. und Ph.*, 1900, p. 141), on study of the subject with an artificial urine of known strength, finds that the coefficient is not constant; that the line representing relation of density is not straight, but a hyperbola. He therefore devised a table which he claims is reliable; unfortunately, however, based on amount of total solids of invariable composition, viz.: Urea, 60 per cent.; salt, 36 per cent.; extractive (sugar), 4 per cent. Were the proportion of inverted sugar greater than that above, different results might be obtained, and likewise the presence of albumen may affect result, hence extended work is highly desirable. Amann's table in abbreviated form is as follows:

Specific gravity	1·010	1·015	1·020	1·025	1·030	1·035	1·040
Total solids, grammes in litre .	20·3	30·8	41·6	55·5	70·3	83·4	95·2

Lastly he gives an equation for estimation of total solids in urine of any specific gravity, namely, total solids $= 6{\cdot}4 + 1{\cdot}02\ P + 0{\cdot}037\ P^2$; "P" representing difference between specific gravity of the urine and that of water, expressed in units. H. V. A.

EDITORIAL.

THE SEMI-CENTENNIAL OF THE A.PH.A.

There is a marked difference in the duration of the germinating and life periods of different animals and plants, and the same may be said of the projects and undertakings of men. Hardly was this nation entailed in the conflict with Spain than rich men gave munificently to provide for the exigencies of war. The nation to a man willingly contributed to the war taxes. Not always, however, do appeals to men meet with such ready responses. This applies more especially to appeals made for the establishment of memorials perpetuating the lives and names of the learned and the great. The merits of those who are truly distinguished appeal for the most part to special classes, and it generally devolves upon a few who have a particular regard and affection for them and their work to execute the tasks in hand.

Last May the Huxley memorial statue was unveiled in the Museum of Natural History, South Kensington, London. It required over four years (since November 27, 1895) for the committee to collect £3,380 for this purpose. Almost all memorials which are of real, lasting consequence require time for decision in regard to the most fitting character of the memorial, and also for the devising of ways and means for collecting funds for such purposes. Nearly two years have elapsed since Albert E. Ebert suggested to the American Pharmaceutical Association (see Proc., 1899, p. 115) that something be done by that Association to revive the memory of Professor William Procter, Jr. We believe that Mr. Ebert had put forth this suggestion quietly for a number of years to various members of the Association, and no doubt to almost all of the members it has at first seemed as though the project were a great way off and that at the proper time the right thing would be done.

At the semi-centennial of the Association something will no doubt be done by the members that will be worthy of her history and her influence in promoting the welfare of pharmacy and medicine. It will be an unusual opportunity for stimulating the growth of the Association and for extending her influence in the professions and among the people. In order to facilitate the discussion of the various aspects of this celebration at the next meeting of the Association, the Editor of this Journal has sought expressions of opin-

ion from some of its leading members in regard to one phase of the celebration, viz., the proposed memorial to Professor Procter, and some of the letters received in reply will be found in another part of this JOURNAL. Of course there are many who feel a diffidence about placing themselves on record in regard to this matter. It should be said, however, in regard to all expressions of this kind, that every one should feel that there is no inconsistency in changing one's opinions after other expressions have been put forth, and no man need feel that he is bound to adhere to what he has said on this subject if he is satisfied that the project of another is more feasible and more suitable. For, as Emerson says: "If you would be a man, speak what you think to-day as hard as cannon balls, and to-morrow speak what to-morrow thinks in hard words again, though it contradict everything you said to-day." It is the principle that needs to be established first and this is what the replies of those who have contributed in the correspondence referred to accentuate. Indeed, not only is it shown that the Procter Memorial is desired, but that it can be readily accomplished, as the letters of Samuel W. Fairchild and Horatio N. Fraser indicate.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

GRESHOFF'S FISHPOISONS. Part II. Batavia: G. Kolf. 1900. Large 8vo, 253 pages.

It will be of interest to the readers of the announcement of the first part of this valuable addition to phytochemical literature (which appeared in the *Bull. of Ph.* and in *Sc. Amer.*, 1894) to know that its untiring author[1] published recently (September, 1900) Part II.

It is a still more complete summary of reports on poisonous plants than Part I was already. It gives a review of what is said in half a dozen modern languages on fishpoisons *strictiori sensa*; is completed by incorporating plants containing more or less known active principles; interspersed with the author's own good opinion and manifold experience in this field, adding some of his own analyses, to sharpen our appetite for the luxurious intellectual food he sets before us.

[1] Dr. M. Greshoff, of late attached to the Government Botanical Garden at Buitenzorg, is at present chemical director of the Kolonial Museum, Harlem, Holland.

It is somewhat after Dragendorff's "Heilpflanzen der verschiedenen Vôlker und Zeiten," Stuttgart, Enke, 1898, while the owners of Dr. Fred Hoffmann's list of popular names of household remedies, chiefly of the vegetable kingdom ("Pharmac. Rundschau"), will find an extension to that list in Greshoff's book.

The author is mindful of the fact that the use of fishpoisons is not confined to such races as we are pleased to call savages, and produces, to illustrate this, a Dutch newspaper article, dated October, 1898, wherein we are told that fishermen in our large rivers are making such good use of a fishpoison to ply their trade as the most lazy "black" could not improve upon. Heaps of dead fishes sometimes of 50 kilogrammes bulk (weight), accumulate on the borders, killed by little pill (used as a lure) made from bread, powdered seeds of Cocculus indicus and whiskey, of which bait the fishes are very fond.

The whole book breathes a spirit of stirring individual research such as emanated from "Die Pflanzenstoffe" of both Husemanns in its time.

I noted an omission on page 20, which I might be allowed to supply.

Baillon, "Histoire des Plantes," had stated the crushed leaves of different Viola species exhale an odor of hydrocyanic acid. Dr. Greshoff did *not* find HCN, but detected an odor of methyl salicylate (the well-known popular wintergreen-oil odor). From a special investigation on fresh plants in blossom, he concluded the absence of free salicylic acid.

Turning to "Viola tricolor," Inaugural Diss., von Henry Kraemer, aus Chicago (*our* editor!), we read that "Manderlin" worked this problem out in Dragendorff's laboratory, in the year 1881. Mandelin's process of isolating salicylic acid from Viola tricolor (the whole plant) excludes, he said, the *formation* of salicylic acid. It must be present, in the plant, free, uncombined. He found it in the roots of other Viola species, too, in weighable quantities—0·14 per cent. in the plant above the earth, 0·05 per cent. in the root. Those results have been verified by Griffith and Conrad (1884). There must be an enzyme present in the plant which splits up a certain compound, since the methyl salicylate odor is not to be mistaken, and agreed upon by all writers, excluding the wrong information from Baillon. The latest authority on

"Ferments," Reynolds Green, Cambridge, 1899, is silent on Viola and its methyl salicylate.

A few quotations may be made from Greshoff's book:

Anemone nemorosa, a violent poison when fresh; harmless when dry.

Clematis flammula, very poisonous, green; dry, a good fodder.

Clematis caripensis, "blistering leaf."

Delphinium vestitum, "leaves poisonous to goats."

Anonaceæ; very little is known and investigated about the poisonous alkaloids from this family.

Corydalis racemosa; a single leaf will kill a man.

Camellia Japonica., L., C. Sasangua, Thunb. The seeds are poisonous.

Linum usitatissimum; its glucoside yield HCN; the wash-water in flax-works is therefore poisonous to fishes.

Ruta graveolens, abortivum and anthelminticum.

Ilex aquifolium; two or three berries work as an emetic. Twenty are fatal.

Sapindus emarginatus. It seems very strange that bees, insects possessing such a wonderful instinct, should drink the nectar of these poisonous flowers and get killed in this way.

Centaurea scabiosa,

Carduus nutans,

Scabiosa succisa, all benumb bees.

Coriaria Nepalensis; leaves act as a powerful poison; seeds produce symptoms like tetanus.

Cytisine determinations. * * * C. Laburnum; seed contains 1·8 per cent. Ulex Europ.; seed contains 1 per cent. Sophora secundiflora; seed contains 3·5 per cent. Sophora tomentosa, L.; seed contains 2·1 per cent. Baptisia australis, R. Br.; seed contains 1·6 per cent.

Swainsona galegifolia, R. Br. One of the most dreaded plants by stockowners. * * * Some Swainsoneas are excellent fodder plants, while others produce (the) mysteriously fatal effects. Chemical analysis has failed to isolate a toxic principle. * * *

Pachyrizus tuberosus, Spr. The beans, when ripe, are poisonous. The tubers, too, contain a poisonous "resin (?)." This resin is an active fishpoison.

Piscidia erythrina.[1] "The Indians have a tree wherewith they take their fish for their present use, being near their habitations * * * and so they take as many as they please. This is a providence of God to those barbarous people, being a nature help for present food and sustenance."

Leucæna glauca, B. Horses (and asses) lose the hair of their manes and tails by eating the leaves. This fact is well known in the Bermuda Islands. Reviewer assayed some time ago a small quantity of the leaves, but did not detect any alkaloidal or glucosidal active principle therein. I suppose the plant acts only when "fresh."

Eucalyptus microtheca, used by the aborigines of Australia to poison fish, by throwing fresh-cut boughs in the river. The Cucurbitas from the Canaries and East Indian Islands are often used "in full sea" to intoxicate fish. "*The whole yellow pumpkin* is poisonous." This reads queer to Americans, on whose table a pumpkin pie is considered a delicacy. The pumpkin mentioned here is an Abobora amarella. The Dutch terminology of *Kalbas* and *pumpkin* is somewhat mixed; but that is a fault of the language, not of the author. * * * The seeds of most Cucurbitaceæ contain some active principle, a tænifugum, an emeticum, an abortivum.

With the addition that Greshoff gives a few interesting items on some remarkable cryptogames (Cumarine in Polypodium scandess, Lindsæa cultrata and others; an abortivum in Lycopodium Seleg.), I leave further judgment of the book to the readers.

LEIDZ, HOLLAND; STATE UNIVERSITY, J. B. NAGELVOORT.
November 9, 1900.

AIR, WATER AND FOOD FROM A SANITARY STANDPOINT. By Ellen H. Richards and Alpheus G. Woodman, Instructors in Sanitary Chemistry, Massachusetts Institute of Technology. 8vo. Cloth. iv–226 pp. $2. New York: John Wiley & Sons.

The three essentials for human life are air, water and food. The consideration of these essentials in their relation to the needs of daily existence is the province of sanitary science, engineering and municipal finance. The authors in the work before us have taken up the consideration of the subject from the standpoint of the sani-

[1] Compare "Proximate Analysis of the Bark of Piscidia, Er.," by H. Berberich. AMER. JOUR. OF PHARM., September, 1898, p. 425.

tary chemist, and it will do much to equip the chemist for his work and to call his attention to the importance of the work not only from an analytical standpoint, but further in directing the attention of the students as well as the public before whom he may lecture to chemical subjects. Every one ought to be familiar with the facts of the sanitary science of air, water and food.

"The human body, in order to carry on all its functions to the best advantage, must be placed under the best conditions and must be supplied with *clean air*, *safe water*, and *good food*, and must be able to appropriate them to its use. The day is not far distant when a city will be held as responsible for the purity of the air in its schoolhouses, the cleanliness of the water in its reservoirs, and the reliability of the food sold in its markets as it now is for the condition of its streets and bridges. Nor will the years be many before educational institutions will be held as responsible for the condition of the bodies as of the minds of the pupils."

The book treats of the following: *Air:* composition, impurities, relation to human life; the problems of ventilation; methods of examination of air; *Water:* source, properties, solvent power, as a carrier; the problem of safe water and interpretation of analyses; methods of examination of water; *Food:* in relation to human life, definition, sources, classes, dietaries; adulterations and sophistications of food materials, methods of food analysis. The work is to be regarded as an important addition to sanitary chemistry.

VETERINARY COUNTER PRACTICE. A Treatise on the Diseases of Animals and the Most Suitable Remedies for Them. Written expressly for chemists and druggists by qualified and experienced members of the Royal College of Veterinary Surgeons. Third edition. Published at the offices of the *Chemist and Druggist*, 42 Cannon Street, London, E. C. 1900.

It is not generally recognized among pharmacists that veterinary counter practice is a legitimate part of the pharmacists' calling, particularly when situated in the country, as he is more likely from his knowledge and skill with compounding of medicines to be able to supply the requirements of the farmer, stockholder and pet owner. The suggestions in "Veterinary Counter Practice" are not intended as a "substitute for the clinical experience absolutely necessary to the equipment of a competent veterinary practitioner, but in hundreds of cases it will enable the pharmacist to understand cases detailed t

him at his counter, and to supply the most suitable remedy." The arrangement of the contents is as follows: Medical and Surgical Treatment of Domestic Animals; Veterinary Medicines; Diseases of the Horse; Lameness in Horses; Dentition of the Horse; Diseases of Cattle; Diseases of Sheep; Diseases of Pigs; Diseases of Dogs; Treatment of Eye Diseases; Wounds, Sores, etc., in Animals; Diseases of Poultry; Posological Table; Miscellaneous Veterinary Formulæ; Veterinary Surgeons Act; the title "Veterinary Chemist;" the Contagious Diseases (Animals) Acts; Sale of Horses; Veterinary Curriculum; Methylated Veterinary Preparations; Administration of Poison to Horses. A number of illustrations on lameness in horses and dentition of the horse serve to elucidate the text. The book is a valuable one, in not only the information it contains, but in throwing out numerous hints as to how the pharmacist may increase his trade in this particular field.

The Student's Medical Dictionary. Including all the words and phrases generally used in medicine, with their proper pronunciations and definitions, based on recent medical literature. By George M. Gould. Eleventh edition. Enlarged with many illustrations. Philadelphia: P. Blakiston's Son & Co. 1900. $2.50.

The new edition has been enlarged by over 100 pages, contains a large number of new illustrations and a new table of eponymic terms. It is particularly adapted to the wants of students, and contains correct and succinct definitions of all the more common words that are used in the different books, lectures, etc.

The book is of peculiar value to the pharmacist as well as physician and dentist, as the price is reasonable, the size is convenient and the definitions are right to the point.

PHARMACEUTICAL MEETING.

The fourth of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1900–1901 was held on Tuesday, January 15, 1901. Mahlon N. Kline, well known in pharmaceutical circles, presided. The meeting was a notable one, in that a number of papers of exceptional value were presented. Prof. J. H. Beal, of Scio, O., widely known for his important contributions on the subject of pharmaceutical jurisprudence, presented a paper on "A Lesson in Practical Politics Applied to Pharmacy Legislation" (see

page 66). The value of this paper is evidenced by the fact, as stated by the speaker, that the methods outlined by him have been practically applied in securing pharmaceutical legislation in Ohio. The paper is one which is deserving the reading of every pharmacist of the United States, as it shows the value of individual effort, in a most forcible manner, in securing beneficial legislation. In commenting upon the paper, Mr. Kline said that he heartily endorsed what had been said by Professor Beal and that he was convinced that no one could gather together more common sense concerning the manner of securing pharmaceutical legislation than was done by the speaker. Mr. Cliffe likewise said that he had never heard a more succinct statement of the methods to be employed for securing desirable legislation than was brought out in the paper by Professor Beal. He said that he had known the motion to refer a bill to a committee for amendment to be useful in defeating a bad bill, as well as being an epitaph for a good bill, as brought out by Professor Beal. Mr. Cliffe referred to the proposed pharmacy law for the State of Pennsylvania and said that it differed from the old one in certain respects, in that it (*a*) required all stores to have a license which must be renewed annually; (*b*) the registration of apprentices at a nominal fee, which would serve to establish their identity; (*c*) registration in two grades; (*d*) an improvement in the clause relating to poisons. Mr. Cliffe further suggested to those present that they speak of this meeting to proprietors and others in their respective neighborhoods, urging them to support the proposed law. Professor Remington commended very highly Professor Beal's labors for securing desirable legislation and said that he was glad that the paper was so unanimously endorsed by the meeting. A special vote of thanks was given Professor Beal for his valuable paper and for the efforts he had made in coming so far to present it at this meeting.

An exceptionally valuable paper and one having special interest at this time, on account of the revision of the U.S.P., on "The Chemistry of Ipecacuanha," by Dr. B. H. Paul and A. J. Cownley, London, was presented on behalf of the authors by Professor Kraemer (see page 57).

Mr. M. I. Wilbert gave very interesting papers on "The Use of X-Rays in Detecting the Adulterations in Drugs" and "The Production of Nitric Acid from Atmospheric Nitrogen," both of which he demonstrated by means of electrical apparatus supplied by Messrs.

Queen & Co. The paper on "The Use of X-Rays in Detecting the Adulterations in Drugs" appears in full in this issue. The others, on "The Production of Nitric Acid from Atmospheric Nitrogen" and "Commercial Asafœtida," will be printed in the March issue of this JOURNAL. Those commenting upon these papers were Professors Remington and Lowe and the Chairman.

J. Percy Remington presented a paper on "Improvements in the Remington Pharmaceutical Still," which was illustrated by means of the apparatus, exhibited both in sections and in operation. Mr. Wallace Procter said that he had used this still for a good many years and that the improvements in clamps for securing the head of the still and the attachment for holding the condenser were desirable features. Mr. E. M. Boring said that he had used the Prentis still for the making of aromatic waters and found the apparatus to fulfil all his wants, and said that it had in its favor the fact that no clamps whatsoever were used. He said that he thought the adaptation of the boiler idea with condenser, as in the Remington still, was a good one.

Among the pieces of apparatus exhibited was "The Druggists' Label Gummer," which is intended to do away with the old method of paste and brush and appears to be particularly adapted where large numbers of labels are used.

Mr. W. L. Cliffe presented to the College two mortars, one which he obtained while on a recent trip to Mexico, which was made of stone of volcanic origin and used in the grinding up of Chile or red pepper, which is largely used with corn meal in that country. The other was a carved wooden mortar cut out of a solid block of wood, and was obtained from Arabia, it being used there in the grinding of coffee.

Mr. Wallace Procter exhibited a pair of saddle-bags which had been used during the Mexican war by Mr. Mordicai, a former Philadelphian, an engineer in the U. S. Army. The bags still contained a number of medicinal preparations, as essence of peppermint, ammonia water, morphine sulphate, calomel, ipecac, jalap, laudanum, compound cathartic pills and iodide of potassium pills.

Among the papers to be presented at the next meeting on February 19th are the following:

(1) "Remarks on a New Cold Cream and Other Ointments." By William C. Alpers, Sc.D., New York City.

(2) "Why do Syrups Spoil?" By Alfred I. Cohn, New York City.
(3) "Assay of Coca." By William R. Lamar, New York City.
(4) "Gum Mastic." By Henry C. C. Maisch, Ph.D.
(5) "The Ebulliscope." By William R. Lamar, New York City.

H. K.

PHILADELPHIA COLLEGE OF PHARMACY.

The quarterly meeting of the members of the Philadelphia College of Pharmacy was held December 31st, the President, Howard B. French, in the chair. Nineteen members were present. The minutes of the semi-annual meeting, held September 24th, were read and approved as read. The minutes of the Board of Trustees for the months of October, November and December were read by the Registrar, W. Nelson Stem, and approved as read.

The consideration of the proposed addition to the By-Laws submitted at the September meeting (and published in the AMERICAN JOURNAL OF PHARMACY for November, 1900, page 562) was then taken up and, after slight amendments, was adopted. The Revised Code of Ethics was then taken up for action (a printed copy having previously been mailed to the members), and after consideration by section was adopted with slight alterations in the phraseology of section (4) four.

Mr. Beringer presented a printed copy of the newly revised By-Laws, and as this completed the work of the Committee, asked that they be discharged. The report was accepted and the Committee discharged with the thanks of the members.

The President reported that he had asked the solicitors of the College for an opinion as to the advisability of copyrighting the name and seal of the College, who reported against the advisability of it, as under existing laws it would not prevent any one from using the name of the College for business purposes.

Announcement was made of the death of our fellow-member, David Preston, which occurred on the 22d of October, at Fallston, Md. Mr. Preston was elected a member in 1874. No further business, the meeting, on motion, adjourned.

C. A. WEIDEMANN, M.D.,
Secretary.

THE AMERICAN

JOURNAL OF PHARMACY

MARCH, 1901.

THE CHEMISTRY OF IPECACUANHA.

By Dr. B. H. Paul and A. J. Cownley.

(*Concluded from p. 66.*)

In our examination of the alkaloids of ipecacuanha the Brazilian variety was employed in the first instance. The extraction was carried out in the following manner, mainly to avoid any possible deleterious action on the alkaloids: A quantity of the drug was extracted with cold alcohol, the alcoholic percolate mixed with basic lead acetate, filtered, and the excess of lead removed with dilute sulphuric acid. The filtrate was neutralized and the alcohol distilled off. The clear solution was then agitated with ether and ammonia. That ether solution was next shaken out with weak sulphuric acid and the acidulated solution repeatedly shaken with caustic soda, in the presence of ether, until cephaeline, the base soluble in caustic alkali, had been completely separated. The base, insoluble in weak caustic alkali, was then converted into hydrochloride and the salt recrystallized from water. Finally, the base was precipitated by ammonia. In the examination of New Granada ipecacuanha the powdered drug was mixed with lime and extracted with amylic alcohol and the bases then separated as before described. In order to obtain the crystalline emetine hydrochloride more readily, cephaeline should be completely separated by treatment with caustic alkali. Cephaeline is obtained from the caustic soda liquor by neutralization with acid and then shaking out with ether and ammonia.

The third alkaloid, which we have named psychotrine, was obtained by extracting with chloroform, the ammoniacal liquid from which emetine and cephaeline had been separated by ether.

EMETINE.

Emetine is apparently an amorphous base and almost colorless. It melts at about 68° C., is strongly alkaline to litmus, and neutralizes acids completely. On exposure to light it becomes of a yellowish color. It is readily soluble in alcohol, ether, chloroform or benzine, but is only sparingly soluble in hot petroleum spirit or in water. On evaporation of any of these solutions emetine is left in the form of a transparent varnish. Emetine is insoluble in solutions of caustic alkali, and is thus distinguishable from cephaeline.

Analysis of the base, emetine, which had been prepared from the crystalline emetine hydrochloride by precipitation with ammonia, gave the following results. These results correspond very closely with those obtained by Glènard and with the formula $C_{15}H_{22}NO_2 = 248$ or $C_{30}H_{44}N_2O_4 = 496$.

	1.	2.	Mean.	Theory.
Carbon	72·23	71·80	72·01	72·58
Hydrogen	8·71	9·02	8·86	8·87
Nitrogen	—	5·75	5·75	5·64
Oxygen	—	—	13·38	12·91
			100·	100·

The platinochloride was obtained as a buff-colored amorphous precipitate, almost insoluble in water or alcohol. It was dried until constant at 100° C., being partially decomposed at 120° C. On analysis ·208 gramme gave ·045 gramme platinum = 21·63 per cent. Calculated for $(C_{15}H_{22}NO_2)_2PtCl_42HCl = 21·53$ per cent. Molecular weight of the platinum salt, 905·7.

On titrating emetine with hydrochloric acid it was found to require for neutralization 14·56 per cent. HCl; this result corresponds with 12·71 per cent. in the hydrochloride, the calculated quantity being 12·83 per cent., agreeing with the formula $C_{15}H_{22}NO_2HCl$ or $C_{30}H_{44}N_2O_4.2HCl$.

The saturating power of the base is, of course, the same whether emetine is expressed as monovalent $C_{15}H_{22}NO_2 = 248$, according to Glènard, or bivalent with the formula $C_{30}H_{44}N_2O_4 = 496$, as in either case 248 parts of emetine are equal to 36·5 parts HCl or 496 parts to 98 parts H_2SO_4, respectively.

Emetine hydrochloride may be obtained in a crystalline form by evaporating a water solution slowly or by adding ether to an alcoholic solution. From water the salt crystallizes in radiating groups

of silky filaments, which are very readily soluble in water. The hydrochloride is rendered anhydrous at 100° C. The dried salt on analysis gave 12·91 per cent. HCl. Calculated for $C_{15}H_{22}NO_2HCl$ or $C_{30}H_{44}N_2O_4.2HCl$, requires 12·83 per cent. HCl.

The salt crystallizes with greater facility in the presence of an excess of acid. On adding moderately strong hydrochloric acid to emetine it is immediately converted into a bulky mass of fine silky crystals, whereas the formation of crystals from a neutral aqueous solution of the salt does not take place when the solution is dilute until some time has elapsed and the solution has become concentrated. This difference of behavior suggested the possibility that an acid salt was formed, but, on analysis of the silky mass of crystals formed on adding strong acid to the base, that was not found to be the case. Considerable difficulty was found in obtaining the crystals which separated from an acid solution in a fit state for analysis on account of the large quantity of mother liquor absorbed by the crystals. Drying by heat gave a neutral salt containing 12·83 per cent. HCl as required by theory. Analysis of the crystals well pressed on bibulous paper showed that no acid salt is formed, but that the presence of free hydrochloric acid merely promotes the crystallization of the neutral salt. The following results were obtained with the material thus imperfectly dried :

	Found.	Calculated for $C_{15}H_{22}NO_2.HCl.3H_2O$ or $C_{30}H_{44}N_2O_4.2HCl.6H_2O$.
Emetine	67·62	73·26
HCl	12·79	10·78
Water	19·59	15·96
	100·	100·

The amount of hydrochloric acid in a dry acid salt having the composition $C_{15}H_{22}NO_2.2HCl$ or $C_{30}H_{44}N_2O_4.4HCl$ would be 22·74 per cent.

Emetine Hydrobromide.—This salt can be obtained by adding potassium bromide to a solution of emetine hydrochloride or by neutralizing the base with hydrobromic acid. It crystallizes in tufts of silky needles. Emetine hydrobromide is now prepared on a commercial scale, and a sample supplied to us by Mr. W. G. Whiffen gave on analysis the following results:

	EmHBr. Commercial Crystalline.	Anhydrous.	Calculated for $C_{15}H_{22}NO_2.HBr$ or $C_{30}H_{44}N_2O_4.2HBr$. Anhydrous.
Emetine	66·90	75·25	75·38
Hydrobromic acid	22·01	24·75	24·62
Water	11·09	—	—
	100·	100·	100·

The commercial salt appears to approximate to a salt having the following composition:

Emetine	67·95
HBr	22·19
Water	9·86
	100·

which corresponds with the formula $C_{15}H_{22}NO_2HBr.2H_2O$ or $C_{30}H_{44}N_2O_42HBr.4H_2O$.

Emetine hydrobromide becomes anhydrous at 100° C., and the crystalline salt effloresces on exposure to air, until it has the composition approximating to a salt with the above composition, when it remains constant. It is a permanent salt, undergoing no alteration in color after being kept for some months. It is readily soluble in water, but much less so than emetine hydrochloride, difficultly soluble in absolute alcohol or in chloroform.

Emetine hydriodide was obtained in the form of silky needles by slow evaporation of its alcoholic solutions, and the nitrate in crystalline tufts by dissolving the nitrate in alcohol and adding ether.

The mercury salt was obtained in granular crystals, which melt to a resin in hot water on adding mercuric chloride to emetine hydrochloride. The chromate, picrate, ferricyanide and the gold salt have also been obtained. The sulphate, acetate and oxalate are very soluble in water or alcohol, and apparently uncrystallizable.

CEPHAELINE.

This base, when precipitated from a solution of its salts by ammonia, is colorless; but, like emetine, it soon acquires a yellow color on exposure to light. It is very much less soluble in ether than emetine and is very sparingly soluble in cold petroleum spirit, but with the aid of heat is more freely dissolved, and on cooling the solution is again deposited in a flocculent form. On evaporation of a solution

of cephaeline in alcohol, ether or petroleum spirit, the base is left in the form of a faintly yellowish transparent varnish. From ether cephaeline separates in the form of bunches of delicate silky needles which form more readily in the presence of water. It is readily obtained in a crystalline form by agitating a salt of cephaeline with ether and ammonia, when cephaeline crystallizes out almost immediately. Cephaeline precipitated by ammonia melts at about 102° C. The crystals from ether melt in a capillary tube at 96°–98° C. On exposure of the crystals to a temperature of 100° C. there is a loss of weight amounting to 4·78 per cent.; at 120° C. there is no further loss in weight, but the base acquires a brown color without melting and evidently undergoes some alteration which has not yet been studied.

Cephaeline is soluble in dilute caustic alkali and is thus readily separated from emetine.

Analysis of the anhydrous base gave the following results, which correspond with the formula $C_{14}H_{20}NO_2 = 234$ or $C_{28}H_{40}N_2O_4 = 468$:

		Calculated.
Carbon	71·28	71·79
Hydrogen	8·69	8·54
Nitrogen	6·24	5·94
Oxygen	13·79	13·73
	100·	100·

On titrating the base it was found to require for neutralization 15·66 and 15·67 per cent. HCl, the calculated quantity for the above formula as monovalent $C_{14}H_{20}NO_2$ or as bivalent $C_{28}H_{40}N_2O_4$ being 15·59. The mean of these results would give 13·54 per cent. of HCl in the salt as against 13·49 per cent. calculated.

The platinochloride is yellow and decidedly darker in color than the corresponding salt of emetine. On analysis it gave 22·38 per cent. of platinum, the calculated quantity for the formula $(C_{14}H_{20}NO_2)_2.PtCl_4.2HCl$, molecular weight 878, being 22·21 per cent. platinum.

Cephaeline Hydrochloride.—Cephaeline, like emetine, forms the crystalline hydrochloride with greater facility in the presence of excess of acid. It crystallizes in fine transparent rhombic crystals and has the composition represented by the formula

$$C_{14}H_{20}NO_2.HCl3H_2O \text{ or } C_{28}H_{40}N_2O_42HCl,6H_2O$$

PSYCHOTRINE.

This alkaloid exists in ipecacuanha in very small amount, relatively, to emetine and cephaeline, and it differs from those alkaloids in being very sparingly soluble in ether. As previously mentioned, it is obtained by extracting with chloroform the ammoniacal liquid from which emetine and cephaeline had been previously extracted by ether. The quantity obtained was too small to allow of complete examination, but the physical characters of psychotrine distinguish it in a very definite manner. It is a crystalline alkaloid which separates from ether in well-defined transparent prisms of a pale lemon yellow color. It melts at about 138° C., neutralizes acids, and apparently has a much higher molecular weight than either emetine or cephaeline. Psychotrine dissolves readily in alcohol or chloroform, the solutions becoming dark-colored on exposure to light and depositing a dark brown substance.

In order to obtain more precise information as to the molecular weight of emetine and cephaeline than is given by the analysis of their platinum salts, we carried out many experiments for that purpose, employing Beckmann's boiling point method.

In dealing with emetine and cephaeline there are several difficulties to be overcome in order to accurately ascertain the rise in the boiling point of the solvent as the basis of the molecular weight determination. Sakurai, Landsberger and others have suggested modifications of Beckmann's process in order to obviate the variations peculiar to it; but in dealing with emetine and cephaeline there is difficulty in obtaining the solvent that shall have no action on the alkaloid at the boiling point of the solvent. Ether is the only solvent for emetine and cephaeline that we have found to allow the solution of the alkaloid to be boiled without decomposition of the alkaloid as judged by the change in color. Ether, however, has the great disadvantage that when in a dry condition it does not readily dissolve these alkaloids. When emetine and cephaeline are liberated in a nascent condition they are readily dissolved by ether in the presence of water, but that is not the case when the dry base is added to perfectly dry ether. Dry chloroform and absolute alcohol readily dissolve these bases, but judging from the intense darkening of the solutions and separation of flocculent matter after boiling, there is an apparent alteration. Trustworthy results with ether could only be obtained by employing the modification of the

method suggested by Sakurai,[1] of weighing the solvent after noting the rise in temperature and ascertaining the amount of alkaloid dissolved in the ascertained quantity of the solvent.

The results obtained by Beckmann's method were as follows:

		Molecular Weight.
Emetine.	Ether as solvent.	Mean.
Molecular weight	(1) 249 319 283 294	286
	(2) 240 334 285	286
	Ethylic alcohol as solvent.	
	353 (1) 381 519 477	432
	(2) 484 527 547	519
	(3) 473 439 652	521
	Chloroform as solvent.	
	(1) 402	402
	(2) 469	469
Cephaeline.	Ethylic alcohol as solvent.	
	533 593	563

The figures 1, 2, 3 denote that there was a first, second and third addition of the alkaloid to the same solution. With the exception of ether, the solvents employed have, as already noted, a great color-changing action on the alkaloids. The simple expression of our analytical data gives the empirical formula for emetine as $C_{15}H_{22}NO_2 = 248$, and for cephaeline $C_{14}H_{20}NO_2 = 234$, in which case the figures have a monobasic value. The determination of the weight of the molecule as shown by the rise in boiling point when employing ethylic alcohol and chloroform as solvents, while not entirely satisfactory from the possibility of decomposition of the alkaloids having to some extent taken place, nevertheless points to the molecular formulæ and weights being for emetine $C_{30}H_{44}N_2O_4 = 496$, and for cephaeline $C_{28}H_{40}N_2O_4 = 468$. On this point, however, further information no doubt will be forthcoming from such results as may be obtained by a splitting up of the molecule.

It is satisfactory to be able to chronicle the fact that the results as above obtained in the investigation of the ipecacuanha alkaloids have been practically confirmed by so eminent an authority on alkaloids as Dr. Hesse, who kindly gave us the benefit of his valuable

[1] *Jour. Chem. Soc.*, LXI, 989.

assistance by examination of emetine and cephaeline;[1] as well as by E. Merck.[2]

Dr. Hesse's results as compared with our own are thus tabulated:

Emetine.	Paul and Cownley.	Hesse.	Calculated. Paul and Cownley. $C_{15}H_{22}NO_2$ or $C_{30}H_{44}N_2O_4$.	Calculated. Hesse. $C_{30}H_{42}N_2O_4$.
C	72·01	71·99	72·58	72·87
H	8·86	8·12	8·87	8·50
N	5·75	—	5·64	5·66
Platinum	21·63	21·67	21·52	21·56
Cephaeline.			$C_{14}H_{20}NO_2$ or $C_{28}H_{40}N_2O_4$.	$C_{28}H_{38}N_2O_4$.
C	71·28	71·84	71·79	72·10
H	8·69	8·11	8·54	8·15
N	6·24	—	5·94	6·00
Platinum	22·38	22·40	22·21	22·24

In other words, then, these results agree so closely that our formulæ for the two bases may be accepted as correct if we assign to each the formula respectively as, emetine, $C_{30}H_{44}N_2O_4$, and cephaeline, $C_{28}H_{40}N_2O_4$, as will be seen by the following molecular weights:

	Emetine.	Cephaeline.
Paul and Cownley	248 x 2 = 496	234 x 2 = 468
Hesse	494	466

THE PHARMACOLOGY OF EMETINE AND CEPHAELINE.

Dr. R. B. Wild, Lecturer on Materia Medica and Therapeutics at Owens College and the Victoria University, Manchester, has kindly carried out the experimental investigation of the comparative action of emetine and cephaeline upon certain tissues and organs, in the pharmacological laboratory of the Owens College. The results obtained afford some information as to the relative activity of these bases and give some indications of their therapeutic value.[3] The hydrochlorides of the bases were respectively employed. It was found that emetine and cephaeline both possess powerful emetic action; but the emetic dose of emetine was double that of cephaeline; on the other hand, the nausea produced by cephaeline

[1] *Pharm. Journ.*, LXI, 98.

[2] *Berichte*, 1894, 50.

[3] *The Lancet*, Nov. 23, 1895.

is double that of emetine. For therapeutic use it seems probable that in cephaeline we have a powerful and certain emetic in doses of 5 to 10 milligrammes. In acute catarrh and fever, where vomiting is not required, emetine in small doses seems likely to prove of considerable value, and as an emetic in doses of 10 to 20 milligrammes when a more depressing action is required. In other words, then, emetine is a good expectorant, but cephaeline not quite its equal, while cephaeline is undoubtedly superior as an emetic.

BRAZILIAN AND COLUMBIAN IPECACUANHA.

The observations of Dr. Wild are of importance as indicating that ipecacuanha for pharmaceutical purposes must be regarded from the nature and the amount of emetine and cephaeline rather than from its botanical source.

The results of analyses of selected samples of the two kinds of ipecacuanha show that although the total amount of alkaloid in the two kinds does not differ materially, the proportions of emetine and cephaeline are so different that the drugs cannot be regarded as interchangeable.

This is apparent from the following analyses:

	Brazilian.		Columbian.
	Root.	Stem.	
	Per cent.	Per cent.	Per cent.
Emetine	1·45	1·18	0·89
Cephaeline	·52	·59	1·25
Psychotrine	·04	·03	0·06
	2·01	1·80	2·20

This difference is made clearer from the following percentage composition:

	Brazilian.		Columbian.
	Root.	Stem.	
Emetine	72·14	65·6	40·5
Cephaeline	25·87	32·8	56·8
Psychotrine	1·99	1·6	2·7
	100·	100·	100·

The method of analysis adopted consists in taking 50 grammes of the root, mixing with one-fifth of its weight of lime, moistening with water and then extracting with amylic alcohol. The amylic percolate is extracted with dilute acid, and the acid liquid shaken out with ether and ammonia to extract the emetine and cephaeline, leaving psychotrine to be extracted by chloroform from the ammoniacal liquid. The ether residue, consisting of emetine and cephaeline, is then titrated with semi-normal hydrochloric acid, of which 1 c.c. = 0·124 gramme emetine and 0·117 gramme cephaeline. Emetine and cephaeline are then separated by treating the hydrochloric acid solution with caustic soda in the presence of ether and repeatedly shaking the ether solution with soda until all the cephaeline has been separated. The ether solution of emetine is evaporated and the residue titrated with standard acid, the result being expressed as emetine. The soda liquor is acidified, shaken with ether and ammonia, and the ether residue of cephaeline titrated as with emetine. The total number of cubic centimetres of semi-normal hydrochloric acid used in titrating the separated bases, emetine and cephaeline, should equal the number required before their separation. When the separation has been satisfactorily made, the emetine hydrochloride should be readily obtained in a crystalline form on evaporating the solution, and the solution of cephaeline hydrochloride should give the characteristic crystals of cephaeline when shaken with ether and ammonia.

The statements made by some observers, that ipecacuanha root which has been deprived of its alkaloids has a greater therapeutic value in the treatment of dysentery, require to be received with doubt, inasmuch as the so-called de-emetinized ipecacuanha has not been found in our experience to be entirely free from alkaloidal contents. In fact, as much as 0·5 per cent. of total alkaloids is not uncommon. Some attempt, however, was made to isolate and study another constituent of ipecacuanha from the basic lead precipitate previously mentioned as obtained in our separation of the basic constituents. A crystalline constituent was obtained of the nature of a glucoside somewhat resembling saponin. It had no emetic action in doses of 0·25 gramme.

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A NEW COLD CREAM.

By William C. Alpers, Sc.D.

In proposing a formula for a new cold cream, I beg to apologize in advance if what I am going to say is not new to you. In these days of continuous research by thousands of ambitious, restless minds, we are never sure that some one else has not long ago discovered what we consider as new. The only safeguard against such repetition consists in the diligent reading of pharmaceutical and chemical journals, and here I must confess to a sin of omission; for the pressure of business during the last two years has not left me time enough to do my full duty in this respect.

The words "cold cream" have a double meaning. As a preparation of the Pharmacopœia, the synonym of Unguentum Aquæ Rosæ, its formula is, of course, definite and fixed, and no ointment, however superior, can be dispensed in its place. But, besides this Pharmacopœial meaning, cold cream is a collective name for all unctious preparations that serve as an emollient for the skin, and the laity, when asking for cold cream, care but little whether the ointment that they receive is made after one formula or another, as long as it is soft and soothing, of grateful odor and desired efficiency. We all know that the official preparation, while fulfilling all these requirements when freshly made, cannot be depended upon after only a short time, particularly when exposed to a sudden change of temperature. In pharmacies where the sale of toilet articles is made a special feature, the official cold cream is entirely unavailable; for when put up in sealed packages, we never know in what condition it may be when sold. For this reason nearly every enterprising pharmacist has his private formula, differing more or less from the official one, and it may be stated without fear of contradiction that none of the numerous proprietary cold creams are made in accordance with the Pharmacopœia. It is for such a preparation, uniform in all climates and available under all conditions, that I propose this new formula. The disturbing element in the official preparation being the oil, a proper substitute was found in the so-called paraffin oil, also sold under the name of mineral oil or white oil. Care must be taken to select the best quality, entirely free from odor and color.

The formula is as follows:

White wax	150 parts.
Paraffin oil	600 "
Water	240 "
Borax	9 "
Oil geranium	1 "
Oil rose, 10 to 20 drops	
To make	1,000 parts.

Dissolve the wax in the oil with the aid of a gentle heat; in another vessel dissolve the borax in the water; bring both solutions to the same temperature, not exceeding 60° C. (140° F.), and pour the aqueous solution into the oil in a continuous stream. Stir gently for a minute or two, add the essential oils while stirring, and pour into jars before cold.

This preparation is a snow white, soft and smooth ointment of glossy appearance and pleasant odor, far surpassing in elegance the official cold cream. The time to prepare it is less than fifteen minutes. It will keep in the heat of summer and the cold of winter, becoming but slightly thinner in summer. From the testimony of those that have used this preparation, it is fully equal, if not superior, to any other cold cream, rendering the skin soft and white and exercising a soothing influence on irritated surfaces, chapped hands and lips. The cost is much less than that of the official cold cream.

In preparing this ointment a few points must be carefully observed. Do not overheat your solutions; if too hot, a much inferior preparation will result. Let both solutions be of the same temperature; for this reason I use a chemical thermometer as a stirring rod. Be careful to wipe the stirring rod (or thermometer) each time when you move it from one solution to the other. Do not stir very briskly after mixing the two solutions. Be sure of the purity of the wax; do not take a mixture of paraffin and wax which is sold often as white wax and foolishly preferred by some on account of its greater whiteness.

Instead of plain water, rose water, or water with any desired odor may be used, omitting the oils afterwards, or other fragrant oils may be substituted for the essential oils. The quantities of oil and wax may also be varied to produce an ointment of different consistency.

The most remarkable feature of this cold cream is the fact that it

changes its consistency but slightly in various temperatures, and never loses its grateful odor and elegant appearance. This quality was certainly imparted by the use of the mineral oil, and the thought naturally suggested itself to use this oil also in other ointments with the view of making them more stable and uniform. I intended to make a series of experiments in this direction, but lack of time during the last two years prevented me from carrying out my intention. I can only submit to you two samples, one of simple cerate in which 100 parts of lard have been replaced by the same quantity of mineral oil, and one of camphor cerate, in which the cotton-seed oil has been replaced by mineral oil. The former one, the simple cerate, prepared last July, has stood for a long time in direct sunlight without showing signs of granulation or decomposition. I trust that these few remarks may encourage others to take up this work, which seems to promise good results.

WHY DO SYRUPS SPOIL?

By Alfred I. Cohn, Ph.Gr., New York.

The reason why the syrups of the U. S. Pharmacopœia so frequently spoil is a question that has engaged the attention of many investigators. The spoiling has been ascribed to various causes, and almost as many means have been proposed for its avoidance; in fact, a search through the literature of pharmacy of the past decade or two will bring to light a striking variety of expedients adopted for preventing or retarding decomposition in Pharmacopœial syrups, not only individually, but collectively as well.

Among the causes which are prone to occasion deterioration in syrups, the following are the most prominent:

(1) Thinness of syrup, *i. e.*, insufficient sugar has been used, whereby the syrup obtained is not sufficiently dense.

(2) Constant or prolonged exposure to too high a temperature, as in a room heated too warmly; proximity to a heater, etc.

(3) The presence of substances prone to ferment, such as acacia, albumin, gelatin, pectinous matter, etc.

(4) Exposure to light, as in the case of syrups containing ferric salts.

(5) The presence of substances which are naturally inclined to be unstable, such as hydriodic acid, hypophosphites, etc.

(6) Fermentation due to the action of yeast or other microbic agents.

(7) Impurities in the sugar used in making the syrup, *e. g.*, ultramarine, etc.

On carefully examining these causes we find that, with the exception of one or two, perhaps, they are all practically under the control of the pharmacist, as we shall see.

It is a well-known fact that a syrup of proper density is far less prone to spoil, provided, of course, it be made from proper materials, than is a syrup made with insufficient sugar. On the other hand, a *too* concentrated syrup is just as likely to spoil as a weak syrup, because it is equally well known that a very concentrated syrup will deposit crystals of sugar, and, in so doing, will become weaker in sugar than if made with just sufficient sugar. In other words, the latter, in crystallizing out, leaves the syrup deficient in sugar. Hence it follows that a very concentrated syrup must not be kept in a place where the temperature is likely to fall much, otherwise the syrup, having deposited the excess of sugar, which it does not take up again without heating, becomes too thin and may thus readily spoil.

A constant or prolonged exposure to warmth is apt to be detrimental for practically the same reason as mentioned above. The warmth makes the syrup too thin, so to speak, and renders it subject to change.

The presence of easily fermentable substances and those readily prone to decompose cannot, of course, be avoided; hence it is all the more important that due regard be paid to the quality of the syrup used in order not to increase their tendency to decompose, but rather to prevent, or at least retard, decomposition as much as possible.

Exposure to light and the action of microbic agents are also easily avoided or prevented.

We now come to what is, perhaps, the most frequent and most mischievous of all the causes from which syrups spoil, and that is the impurities in the sugar from which the syrup is made.

Syrup made from sugar answering the requirements of the U.S.P. is a very stable preparation, if of proper density. Experience,

moreover, has shown such a syrup to be the best preservative of unstable chemicals, in the sense of its being able to prevent, or at least greatly retard, the decomposition to which such chemicals are prone. Nevertheless, substitutes for it have been proposed or highly recommended, among others the total or partial replacement of the syrup by glucose or glycerin, or even both. In certain syrups additional expedients have also been recommended, yet, in my experience, these substitutes and expedients are unnecessary; in fact, under certain circumstances, they are more likely to aggravate matters.

These substitutes and expedients have all been proposed or recommended, it is my belief, because the syrup as ordinarily made is not prepared from suitable materials. We are all accustomed to consider the sugar we usually buy as so perfectly fitted for every use in our daily domestic lives, that the thought is scarcely likely to occur to one that the spoiling of a syrup may be traced to the quality of the sugar used.

The pharmacist usually obtains his supply of sugar from the grocer; or he may, perhaps, in some instances buy it direct from the manufacturer by the barrel. In neither case, however, is he likely to receive a *pure* sugar, simply because pure sugar has naturally a yellowish color, to correct which the manufacturer adds some blue pigment, usually ultramarine blue, to "whiten" the sugar—just as the laundress blues her linen, and for a similar reason—and thus to render it more agreeable in appearance and hence more salable.

Ultramarine blue, however, is an exceedingly mischievous substance when present in Pharmacopœial syrups, and it is really the most frequent cause of the spoiling of the latter. The quantity of the pigment present in sugar is in no wise sufficient to affect the eligibility of sugar as a daily food, yet it is quite sufficient to cause the decomposition of easily decomposable chemicals. This will be evident if we consider how ultramarine blue is made, and what it is, chemically.

Ultramarine blue is prepared by heating together a mixture of fine white clay or silica with sodium carbonate, sulphur and charcoal; or, a mixture of kaolin, sodium sulphate, sodium carbonate, sulphur and charcoal. According to the proportions taken of the several ingredients, ultramarines of various colors may be obtained.

For instance, there may be prepared deep-blue, light-blue, violet-blue, green, white, violet, red, and also yellow ultramarines. All these pigments are of varying composition, and, using one and the same formula, it is exceedingly difficult, if not almost impossible, to secure uniform results, as the different lots are likely to exhibit varying shades and have different compositions. Hence no positive formula can be properly assigned to any one ultramarine.

According to some investigators, ultramarines are considered to be compounds of aluminum-sodium silicate with sodium sulphide; by others they are believed to be mixtures of aluminum silicate, sodium polysulphide, and sodium sulphate, sulphite, and hyposulphite; still others state them to be aluminum-sodium silicates in which a part of the oxygen is replaced by sulphur; again, many believe them to be compounds of aluminum-sodium silicate with aluminum sulphate.

Whichever of these views is taken, however, the broad fact stands out that an ultramarine is to all intents and purposes a sulphide; whether of aluminum, silicon or sodium makes little difference, so far as its relation to our subject is concerned. When it is also added that ultramarine blue is capable of effecting all the disturbances of which a readily-decomposable sulphide is capable, and that it is decomposed by all acids, even the weakest, as well as by acid salts, such as alum, for instance; when we consider that it is also decomposed by simply boiling (in syrup or water), we may apprehend what an important influence its presence may have in syrups containing salts inclined to be unstable.

The U.S.P. demands that sugar be free from untramarine, yet it is probable that few pharmacists note this requirement with care, and fewer still are likely to test the sugar they buy to see that it is free from this pigment.

It would, therefore, appear expedient, in fact almost necessary, that a form of sugar be made official in the U.S.P. now under revision, which may always be depended upon as being absolutely free from all disturbing contaminations and impurities, and which shall yet be within the reach of every pharmacist.

The sugar which will best answer all requirements is white rock candy. This sugar, because obtained by crystallization, can always be depended upon as being free from ultramarine.

Attention having thus been called to the mischievous properties

possessed by ultramarine, it may readily be seen what reactions the pigment would effect in the individual syrups.

On allowing a simple syrup, made by the cold process, to stand for a while, a deposit forms, consisting of sulphur precipitated as a result of the decomposition of the ultramarine; sometimes the pigment itself is also deposited, particularly if a large quantity has been used in "whitening" the sugar. The syrup is then likely to acquire a rather disagreeable odor. If the syrup is made by boiling, the ultramarine, on continued boiling, is decomposed, and a blackish scum rises, which may be removed. A syrup made by boiling is, hence, apt to keep better than one not boiled.

In syrup of acacia, the calcium gummate and ultramarine react, a calcium sulphide being formed. The syrup, which is naturally prone to decompose even under the most favorable conditions of preservation, is thus made to deteriorate with increased rapidity.

In syrups of citric acid, calcium lactophosphate, lemon and squill, there are free acids present, sufficient to decompose the ultramarine and render the syrups unfit for use.

In syrup of hydriodic acid we have a naturally unstable chemical which requires all our art to properly preserve, and which must be particularly well protected from the action of reducers. With such a chemical, ultramarine immediately gives a reaction. The syrup soon develops a red color and becomes totally unfit for use. This syrup has been the subject of much experiment, with a view to finding means of rendering it more stable. Among these means there has been recommended the partial or total replacement of the sugar by glucose or glycerin. Glucose as ordinarily found on the market is unfit for this purpose, as it nearly always contains appreciable quantities of free sulphuric acid, and is, moreover, very prone to ferment. Glycerin is totally inadmissible, as it enters into chemical reaction with the hydriodic acid, the result being the formation of allyl iodide. The syrup soon develops a straw color which rapidly deepens, while the preparation acquires a disagreeable odor and taste which render the syrup unfit for use.

In syrup of ferrous iodide we have again a readily changeable iron salt, subjected in addition to the action of a sulphide. Naturally enough, ferrous sulphide forms, together with an unstable iodide from which free iodine is soon liberated. In this syrup glycerin would be a good preservative, were it not that pure syrup is very

much better. Glucose is inadmissible because of the reasons already stated. To fully appreciate what effect the presence of ultramarine has on this syrup, it is only necessary to boil a syrup made from ordinary sugar and one made from rock candy. That made with sugar turns brown when the boiling-point is approached, while that free from ultramarine may be boiled for a long time without impairing in any way the fine green tint of the syrup. It is true that the particles of superheated syrup adhering to the flask or evaporating dish above the surface of the liquid may carbonize and impart a color to the syrup when dissolved in the latter, but the color will not be due to decomposition of the syrup, as is the case when a sugar syrup has been used. If care be taken to avoid the solution of the carbonized particles, the boiling syrup retains its handsome brilliant green color. Nor is it necessary to keep any iron wire in a syrup so made, as recommended by some. The syrup may even be freely exposed, and does not require to be kept in well-filled bottles only, or in small, completely-filled bottles.

In the syrups containing hypophosphites, we have again readily changeable salts acted upon by a sulphide. The compound syrup of the N. F. in particular spoils rapidly if any ultramarine is present, whereas if absent the syrup keeps perfectly.

In syrups of senega, senna and rhubarb, we have polygalic acid, cathartic acid and chrysophanic acid present, respectively; in syrup of wild cherry, hydrocyanic and tannic acids; in syrup of blackberry root, tannic acid. In fact, an inspection of all Pharmacopœial syrups will show that there are but few which do not contain one or more constituents imcompatible with and fully able to decompose ultramarine blue.

To go a step further, syrups are valued adjuvants, and, next to water, are perhaps more largely prescribed than any other preparation. Syrups are thus brought into contact with every kind and variety of substance, a fact which in itself furnishes sufficient reason for insisting that a pigment-free syrup be made obligatory in the next Pharmacopœia by replacing the sugar by white rock candy.

It is true the initial expense of preparing such a syrup is greater than when sugar is used, because rock candy itself costs somewhat more than sugar, and because, since it contains more water of crystallization than does sugar, more of it must be used to obtain a syrup of proper density. Notwithstanding the greater first cost,

however, a syrup so made will be found cheaper in the end, if there be taken into account not only the time wasted, but also the pecuniary loss entailed by the necessity of throwing away the spoiled material.

THE ASSAY OF COCA.

By William R. Lamar.

Since the Committee of Revision chosen at the Eighth Decennial Convention for revising the United States Pharmacopœia, held in Washington, during the early part of May of last year, was instructed to append assay processes to as many of the potent drugs and their preparations as were found amenable to assay, where simplicity of process, both as to method and apparatus employed, would lead to fairly uniform results in the hands of different workers, it is reasonable therefore to expect that coca will receive due consideration at the hands of the committee, and the hope is entertained that it will find a place among those drugs finally selected for standardization.

Having frequent occasion to determine the alkaloidal content of this drug, it is thought that a description of the process in use in this laboratory, and one which has been found to give perfectly satisfactory results, might present some points of interest.

It is scarcely to be expected that much which is new or original can be said of any process likely to be put forward for the valuation of this or related drugs, inasmuch as the same general principle underlies them all.

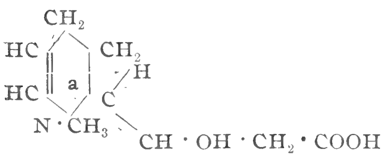
However, by calling attention to and emphasizing such points in the assay as have been found essential, results are easily obtained which are quite concordant and represent fully the value of the drug in question.

It is the writer's opinion that a lack of appreciation of the extreme instability of the alkaloids accompanying coca is, in the main, the cause of the many discordant results in the assays published of this drug.

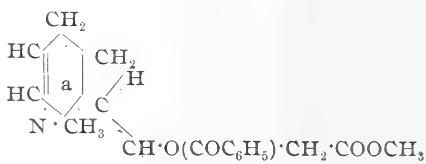
As is well known, cocaine, cinnamyl cocaine and isatropyl cocaine are all methyl esters of a differently substituted ecgonine molecule.

The relationship existing between these bodies can easily be seen from an inspection of the following structural formulæ:

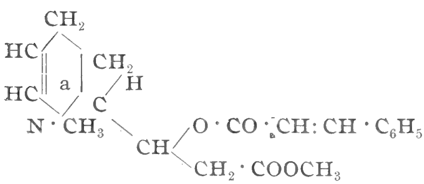
ECGONINE.



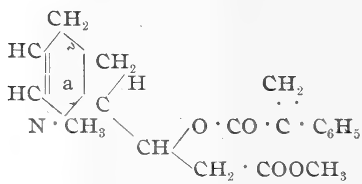
COCAINE.



CINNAMYL COCAINE.



ISATROPYL COCAINE.



It is the readiness with which the methyl group, attached to the carboxyl, is split off, forming, in the case of cocaine, a body, viz., benzoyl-ecgonine, which, although possessing alkaloidal property as regards its behavior to precipitants of such, is nevertheless virtually insoluble in most of the solvents (ether, chloroform, etc.) employed for abstracting the alkaloids from their solutions after rendering alkaline, that the discrepancy above referred to is most likely due.

This saponification occurs quite readily, both in alkaline and acid solutions, and slightly so in neutral solutions with the progress of time, but to a marked extent if there be much elevation of temperature.

Hence it is apparent that a large excess of alkali employed both in the liberation of the alkaloids from their existing combinations in the leaf, and their subsequent precipitation from the solution of their salts, prior to extracting and weighing, is to be especially avoided.

This excess is not only to be avoided, but the strength also of the alkali itself should be as low as is consistent with a complete liberation of the bases.

So also must the strength of acid employed for removing them from the menstruum used be carefully regulated.

The ideal menstruum to be employed in extracting any drug under assay is the one which, while completely removing in a reasonable length of time the alkaloids or other active principles contained therein, at the same time brings into solution the least possible amount of the objectionable, so-called extractive matter, which not infrequently occasions so much trouble in the subsequent steps of the process.

Such a menstruum is confidently believed to exist in the employment of kerosene oil for the exhaustion of coca.

The process about to be described is a modification of the well-known one of the late Dr. E. R. Squibb,[1] in which a dilute solution of ammonium hydrate is substituted for the solution of sodium carbonate employed to liberate the alkaloids from their natural combinations.

The ammonium hydrate appears to be more penetrating, probably due to its volatility, and for this reason it is favored.

The quantities employed and the method of procedure are as follows:

Coca in No. 40 powder	25 grammes.
Ammonic hydrate (2 per cent. NH_3)	25 c.c.
$\frac{N}{10}$ hydrochloric acid	75 c.c.
Ether, Kerosene oil }	each a sufficient quantity.

Place the powdered leaf into an open vessel of suitable capacity (about 450 c.c.); a beaker, except for its fragility, answers very well. However, a covered jar, such as is commonly used for holding solid extracts, has been used to advantage, and in fact is rather to be preferred.

Now add to it 25 c.c. of an approximately 2 per cent. solution of ammonia and mix well together by means of a stout glass rod of such a length that, while in the jar, will just allow the cover to rest in its normal position; permit this to macerate for half an hour, stirring from time to time, the whole being well covered.

At the expiration of this time remove the cover and note whether or not the odor of ammonia is perceptible after stirring; if so,

[1] Ephemeris, Vol. III, p. 1104.

gradually add 75 c.c. of kerosene oil, stirring well after each addition.

After the whole has been intimately mixed, cover the jar and allow to further macerate for an hour or more, stirring at intervals of ten or fifteen minutes.

Transfer to a cylindrical percolator of 500 c.c. capacity (preferably of the Oldberg type) containing a plug of absorbent cotton firmly pressed into its throat; pack only slightly.

Remove the last portions of the leaf from the jar by means of oil delivered from a wash bottle, allowing this to pass through before covering with a fresh supply.

The percolation should proceed at the rate of six or eight drops per minute, collecting about 450 c.c. of percolate. If the process of percolation is carefully executed, a smaller quantity of percolate suffices; sometimes 250 to 300 c.c. are sufficient to accomplish a practical exhaustion of the leaf.

Transfer the percolate to a separatory funnel of 700–750 c.c. capacity of the Squibb pattern, and after rinsing the beaker used to receive the percolate, with small portions of oil, add to the contents of the separator 25 c.c. of $\frac{N}{10}$ hydrochloric acid and shake continuously for ten minutes.

Allow the separator to rest, when the separation will be almost completely effected in twenty minutes; draw off this acid liquid together with the slight amount of emulsion remaining at the line of contact of the two liquids into another separator of from 265–285 c.c. capacity.

Add to the oil remaining in the separator another portion of 25 c.c. $\frac{N}{10}$ hydrochloric acid, shaking and separating as just described, and finally the extraction is completed with a third portion of 25 c.c. $\frac{N}{10}$ hydrochloric acid.

To the united acid solutions of the alkaloids are now added 20 c.c. of ether and the whole well shaken together. After carefully releasing the pressure, the liquids are allowed to separate, the acid liquid is then drawn off into a second separator of like capacity and to it is added a fresh portion of 15 c.c. of ether, the two well shaken together and allowed to separate completely, thus removing the last trace of oil and coloring matter.

The acid solution is now drawn off carefully into a third separator; the ether remaining in the first separator is shaken successively with two portions of water of 5 c.c. each; after separation has taken place, these in their turn are added to the second ether washing, and after shaking and allowing to separate, are drawn off into the third separator containing the major portion of the acid solution. To this is then added a sufficient quantity of ammonia water 10 per cent., previously diluted with four times its volume of water, to render the liquid slightly alkaline.

If the ammonia water used is of proper strength, then 6·64 c.c. of the dilution will be sufficient. However, in practice it usually requires from 8 to 9 c.c.

This method of procedure prevents an unnecessary excess of alkali which, as has been pointed out, exerts a saponifying effect upon the alkaloids, proportional to the degree of its concentration.

(To satisfy one's self of this fact, it is only necessary to add, say 5 c.c. of 10 per cent. ammonia water for the precipitation of the alkaloids, and to remove them by extracting with successive portions of ether, until this latter upon evaporation leaves no weighable residue.

If now, to a portion of the alkaline liquid remaining, a few drops of Mayer's reagent be added, an unmistakable evidence of the presence of benzoyl-ecgonine will be recognized.)

Extract now the alkaloids with three successive portions of ether, using respectively 40, 30, 30 c.c., taking care in each instance to allow the ether to separate completely, drawing off the aqueous liquid carefully into another separator, and pouring the ethereal solution of the alkaloids out through the upper opening of the separator into a tared beaker of 160 c.c. capacity.

Rinse the separator with 10 c.c. of ether, pouring it out at the top, into the separator containing the aqueous portion.

Now hold the separator from which the ethereal solution has just been removed, in the left hand, with the mouth of same inclined downward at an angle of about 45° with and over that of the separator containing the aqueous portion, and while rotating same, rinse the rim with 5 c.c. of ether delivered from a dropping tube in such a way that in falling it will drop into the separator beneath; in a similar manner rinse the cork stopper, and finally add to the

contents of the separator an additional 10 c.c. of ether, making in all 30 c.c. for the second extraction.

Shake the separator with its contents actively for a few moments, then allow the liquids to separate, drawing off the aqueous portion into the separator previously emptied, the ethereal layer being added to that already in the beaker.

This operation is repeated a third time.

The beaker containing the ethereal solution of the alkaloids is set in a warm place (30°–35° C.), and as soon as the ether has evaporated, it is dried at a temperature of 60° C. until of a constant weight, this usually requiring about three hours.

The weight obtained multiplied by four expresses the percentage of alkaloids in the leaf.

The alkaloids so obtained are almost colorless, possessing only a faint cream tint, and are beautifully crystalline in appearance.

If it is desired, as a check upon the weight, they may be titrated, using an excess of $\frac{N}{20}$ sulphuric acid V.S. (about 25 c.c.) and a few cubic centimetres of ether to facilitate the solution, and after the ether has been entirely dissipated, the excess of acid is determined by means of $\frac{N}{20}$ potassium hydrate V.S., using (2) two drops of a cochineal tincture (1 gramme in 25 c.c. of 25 per cent. alcohol).

The factor for the pure alkaloids as determined by numerous assays is 0·01514 gramme as the equivalent of 1 c.c. of $\frac{N}{20}$ H_2SO_4V.S., the extremes being 0·01493–0·0155 gramme.

However, if the assay has been carefully conducted, this is entirely unnecessary, for the gravimetric result is in reality the more accurate, this being due not only to the difference in the molecular weights of the alkaloids, but also to the variable composition of this mixture.

The claim has been made by A. R. L. Dohme[1] that the so-called Keller method is far superior to all other methods for assaying coca, but as none of the methods employed in his comparison was similar to the one just described, it was thought advisable to institute such a comparison.

The following results speak for themselves:

[1] Proceedings Amer. Pharm. Assoc., 1895, 268.

KELLER METHOD.				SQUIBB'S MODIFIED.			
Weight of Alkaloids.	No. c.c. $\frac{N}{20}$ H_2SO_4 V.S. required.	Equivalent of 1 c.c. $\frac{N}{20}$ H_2SO_4 V.S.	Percentage of alkaloids by weight.	Weight of Alkaloids.	No. c.c. $\frac{N}{20}$ H_2SO_4 V.S. required.	Equivalent of 1 c.c. $\frac{N}{20}$ H_2SO_4 V.S.	Percentage of alkaloids by weight.
I. 0·1204 gm.	4·76	0·0253 gm.	1·204	0·203 gm.	13·44	0·0151 gm.	·812
II. 0·1186 "	—	—	1·186	·2042 "	—	—	·817

The sample of coca used was the Huanuco variety (Erythroxylon Bolivianum).

The alkaloids from Keller method were of a very dark brown color and crystallized from ether with difficulty.

It will be seen that while the Keller method does give a considerably higher result gravimetrically, it gives a much lower one by titration.

The cause of the high result of the gravimetric process of Keller is no doubt due to the fact that the light chloroform-ether mixture extracts matter soluble in the dilute acid, which the kerosene oil does not, this foreign matter again entering solution when the alkaloids are precipitated and shaken out with the heavy chloroform-ether mixture.

As a result of very many assays made during the past few years, the conclusion is reached that a leaf to be of good quality should assay by above process about 0·7 per cent. of total alkaloids.

LABORATORY OF SCHIEFFELIN & CO.,

NEW YORK.

COMMERCIAL ASAFŒTIDA.

BY M. I. WILBERT.

Asafœtida has for many years been used extensively as an antispasmodic and also with good effect as a carminative in the flatulent colic of children. In addition to this, it has been used to some

extent in the treatment of certain nervous disorders, and especially in attacks of hysteria occurring at or about the menopause.

Of late years, however, it has come into prominence on account of its value in relieving the flatulence that usually follows as a sequel to abdominal operations. The opening of the abdomen, and the necessary disarrangement of the various organs, seems to cause a suspension of the normal peristaltic action of the intestines, and the tympanites, caused by the consequent inability to expel the accumulated flatus, is the cause of much pain and discomfort to the patient. So far as known, nothing gives as prompt or as much relief as the administration of some form of asafœtida, preferably an enema or a suppository.

It follows, naturally, that the efficiency of the various preparations of asafœtida depends largely on the quality of the raw material from which they are made. Having occasion to handle a considerable amount of this gum, for the manufacture of the various preparations, the writer has at times been much perplexed by the difficulty of procuring a satisfactory supply of the crude drug. Samples of the gum have, from time to time, been compared with the Pharmacopœial requirements, and in almost every instance the amount of alcohol soluble material has fallen decidedly below that required. This fact, and the number of articles that have been published, within a year or more, in the British pharmaceutical journals, commenting on the high standard for asafœtida that has been established by the British Pharmacopœia, and the poor quality of the drug as found in the British market, has induced the writer to make a more systematic study of the available supply of asafœtida.

From correspondence with several drug houses it was learned that the price of asafœtida varied from 12 cents to $1.50 per pound, according to quality. It was also learned that the better grades of asafœtida were extremely scarce in this market, and that at the present time there was no available supply of choice select gum or tears.

The ruling prices for the gum on hand varied from 30 cents to 55 cents a pound. At the latter price a small quantity of loose tears was secured, from which sample No. 1 was subsequently selected. The sample as obtained from the jobber would not have given as favorable results, as it was freely mixed with date stones, transverse sections of roots, small pieces of stone, masses of hair,

pieces of sacking, and in addition to this, many of the tears had quite a considerable amount of coarse sand adhering to them.

Another sample, No. 10 of the annexed list, was kindly furnished from the stock of a local hospital, where it had been on hand for upward of five years. This sample was dry and hard, but, as far as foreign admixture was concerned, was not above the average.

The other specimens were samples of commercial gum, and the results of the examinations, with the prices paid or asked for the various varieties, are indicated in the annexed table :

No.	Source and Description.	Alcohol Soluble.	Insoluble.	Ash.	Price.
1	Loose tears . . . . . New York	70·1	29·9	7·2	$0.55
2	Lump . . . . Philadelphia	44·3	55·7	34·2	.30
3	Choice gum . . . . . New York	41·4	58·6	35·8	.45
4	Mass tears . . . . . New York	36·4	63·6	45·1	.43
5	Lump . . . . New York	31·2	68·8	51·9	.36
6	Lump . . . . Philadelphia	30·2	69·8	50·6	.32
7	Powdered . . . . . . New York	28·5	71·5	46·6	.39
8	Powdered . . . . . . Philadelphia	19·8	80·2	60·6	.35
9	Soft mass . . . . . . New York	18·3	81·7	62·1	.40
10	Old gum . . . . . . Philadelphia	40·5	59·5	45·9	?

The method followed in making these examinations was to take 100 grammes of the drug and, after coarsely comminuting the same, placing it in an Erlenmeyer flask and adding 200 c.c. of alcohol ; the mixture was then set in a warm place for three or four days and occasionally agitated. After this the dissolved portion was filtered through a double tared filter, while the residual drug was then put into a mortar and rubbed down to a paste ; it was then transferred to the Erlenmeyer flask again and the mortar washed out with a sufficient quantity of alcohol, which was added to the drug ; this mixture was allowed to stand in a warm place, with occasional agitation, for several days, and then transferred to the filter mentioned above. Here it was subsequently washed with warm alcohol until the washings from the filter were without odor and did not give any turbidity when added to water. The residual drug was then dried to constant weight in a drying oven and weighed. After being thoroughly mixed, 10 per cent. of this residue was taken and incinerated to obtain the proportionate amount of ash.

It may be noted that the price asked for the crude drug is not necessarily an indication of its quality. Of the eight samples that were examined, just as received from the jobber, one, the poorest (No. 9), was rather above the average in price, while the best in quality (No. 2) happens to have been the cheapest.

As might have been expected, the samples of powdered gum were rather below the average in the amount of alcohol soluble matter. Another feature of powdered gum, and a very important one, is the change that seems to be caused by the drying process; for example, the water soluble portion seems to be so altered or destroyed that it is impracticable to make the official emulsion from the powdered drug, as it will not dissolve readily in hot water.

The practice of adulterating asafœtida seems to be a very old one, and it has been the cause of much comment. Nearly fifty years ago Joseph F. Heathcote published in the AMERICAN JOURNAL OF PHARMACY an examination of powdered asafœtida, only 15 per cent. of which was soluble in alcohol. Following this there are several references to the generally poor quality of asafœtida.

In 1892 G. W. Kennedy read a paper before the Pennsylvania Pharmaceutical Association, in which he reports the examination of ten specimens of gum asafœtida, ranging in alcohol soluble matter from 29·25 per cent. to 68·80 per cent., with an average of 49·36 per cent., or a fraction below that required by the present German Pharmacopœia. Only one of the specimens came up to the requirements of the U.S.P.

Moore and Martin report (in *Chem. and Drug.*, 1899) the result of examining twelve specimens. These varied in alcohol soluble matter from 14 to 39 per cent., and the ash varied from 26 to 63 per cent. of the original weight.

J. C. Umney (*Chem. and Drug.*, 1899) also reports examining a number of samples varying in alcohol soluble matter from 21·1 to 79·8 per cent., and leaving an ash varying from 62·2 per cent. for the lower grades to 3·2 per cent. for picked tears.

Mr. Russel W. Moore (*Jour. Soc. Chem. Ind.*, 1899) gives his results of an examination of 167 samples of asafœtida known to be deficient; only six of these samples contained more than 45 per cent. of alcohol soluble matter.

The deductions to be drawn from these examinations are that the crude drug, as it occurs in this and the English markets, is grossly

adulterated, and never, or at least very seldom, complies with the requirements of the Pharmacopœias. The price asked is not necessarily an indication of the quality. Despite this variation in quality there is still a considerable amount of the drug consumed. This would indicate that it must have medicinal properties for which no substitute has as yet been found.

The continued use of the drug would also seem to require that the Pharmacopœia should in some way try to equalize the strength of the various preparations made from this drug. It might be possible, for instance, to require that the tincture should contain ten parts of the resinous material instead of, as at present, representing the soluble portion of twenty parts of the gum. The amount of drug dissolved could readily be ascertained by drying and weighing the residue left on the filter, and by subsequently diluting the alcoholic solution it could easily be made to correspond to the required standard.

The Pharmacopœia might further direct that the emulsion be made from gum, the alcohol soluble matter of which has first been ascertained.

In view of the fact that powdered asafœtida is used so extensively for pills and suppositories, and that it is very seldom or never reduced to powder by the retail pharmacist, but is always bought directly or indirectly from the drug miller, it would seem quite feasible that the Pharmacopœia include "powdered asafœtida" and require a definite amount of alcohol soluble matter, this to be low enough to prevent agglutination in warm weather, and still high enough to be of value medicinally.

CORRESPONDENCE.

PROCTER MEMORIAL.

In response to a letter from the editor of this JOURNAL concerning the most appropriate way of memorializing the life and work of Professor William Procter, Jr., the following are some of the replies which have been received:

DEAR SIR:—In reply to your kind letter of the 5th inst., it gives me great pleasure to express my high appreciation of the eminent services rendered American pharmacy by William Procter, Jr. It is my opinion that some ever fresh and ever present testimonial to his

services and memory should be instituted by the A.Ph.A., and I know of no more fitting and permanent testimonial than a beautifully executed silver medal, which is to be known as the Procter Medal, and which is to be awarded annually by the A.Ph.A. for the most meritorious service rendered pharmacy in any of its departments, the awarding to be done by the Council of the A.Ph.A., including the chairmen of the scientific, educational, commercial and practical pharmacy sections. It will thus be an honor worthy of the man whose name it bears, and its annual awarding will ever keep fresh in memory the father of our fluid extracts, the typical investigator and lover of science for science's sake, and the man who so closely approximated the ideal of his race.

ALFRED R. L. DOHME.

DEAR SIR:—Your letter of the 11th instant came duly to hand. In my opinion the most appropriate memorial would be a bust cast in bronze by a master. Copies could then be made of alabaster, of which, I am sure, every college of pharmacy at least would want one to place in its halls. Nothing in the way of a memorial would be more classic and nothing would serve the purposes of a memorial better, in my opinion. FREDERICK J. WULLING.

DEAR SIR:—Your esteemed favor of the 7th inst. was received at Detroit during my somewhat prolonged absence from the city, hence this tardy reply.

I favor the project of a properly executed monument to Prof. William Procter, Jr., in the form of a statue to be erected in some central or metropolitan city. My own choice would be Washington. The Capital is visited more extensively by travellers than is perhaps any one city in the United States, barring New York, and it abounds in beautiful statues and works of art, dedicated to the heroes of war, science and literature. The monument to Procter should be chosen with a view to its effect, not on the professional, but on the public mind—such an effect as is produced by the striking statue of Gross, which commands the entrance to the Army Medical Museum at Washington. At the present time comparatively few, even among the educated laymen, realize that pharmacy has produced its fair share of great and eminent men. A beautiful statue of Procter, suitably placed, would help to dispel the error.

JOSEPH HELFMAN.

DEAR SIR:—I have received your kind favor of the 9th inst., and I am very sorry that I did not read the editorial of last November in your esteemed JOURNAL. However, I have read the replies published in your February JOURNAL.

If William Procter, Jr., the father of American pharmacy, is to be commemorated in a befitting manner, by all means let it be a life-size statue of purest Carrara marble. And place the statue in the most conspicuous place in the country. Place it in company with the other great men of our country, whose marble statues adorn Monument Hall in the Capitol, at Washington. This would be my first choice.

As my second choice, the Procter Memorial Laboratory, at Washington, D. C., would be splendid, indeed. (Not the choice, but the laboratory.) It was a little difficult to decide first and second.

Certainly, Philadelphia has first claims on her illustrious son, but since he is a national figure, his monument should stand where the monuments of the most illustrious sons of the nation stand, and that is Washington. G. H. CHAS. KLIE.

DEAR SIR:—The suggestion of Mr. Arny is precisely that which I have had in mind. No doubt the endowment of a scholarship would be an appropriate memorial to the "Father of American Pharmacy," but gifts would not be as freely made to a scholarship connected with any particular school as they would to something in which all sections alike would feel that they had equal share.

A research laboratory is the pressing need to-day of our profession. It will cost money to build and equip such a laboratory. It seems to me that the money can be raised in no easier way than in connection with a memorial to Wm. Procter.

I believe that the laboratory may be made self-supporting from the beginning. We have at present no means of procuring such drugs as belladonna of standard strength. The consumers of such drugs would willingly pay half a cent a pound for an article accompanied with a guaranteed assay. The laboratory could furnish such certified assays for one-half that amount, so that there would be a profit to the laboratory and to the dealer. One would suppose that all pharmacists would prefer the assayed drugs and willingly pay the higher price for them. With more strict require-

ments such as the new Pharmacopœia will no doubt lay down, many will be compelled by State laws to buy the assayed drugs or else themselves assay all they buy.

The stamp of the Procter Memorial Laboratory would thus come immediately to be recognized as authoritative in connection with commercial values. Manufacturers would quickly grasp the idea that the value of their products might be also enhanced by a similar stamp of endorsement, if it should be thought wise to offer it.

In any case, I believe that it would be not too much to require that every proposed new pharmaceutical should be submitted for approval to the Memorial Laboratory, which should refuse to give countenance to anything not exactly what it was represented to be, and should moreover withhold approval from anything whose *bona fide* formula was withheld.

It would be expected that the Pharmacopœial Revision Committee would receive substantial assistance in its work by such a research laboratory, reasonable compensation being made of course for necessary expert work.

While Washington would be the ideal place for the Memorial Laboratory, it seems to me that on business considerations New York would have first claim on it. This with other details of the project may well be left open for discussion, but in my judgment a research laboratory would be the most fitting tribute we could possibly render to the memory of Professor Procter.

A. B. LYONS.

DEAR SIR:—Replying to yours of February 6th, I would say that I look upon the different plans submitted for a Procter memorial this way:

I would be decidedly in favor of a "research laboratory," provided a fund of not less than $200,000 would be raised. This, I am afraid, cannot be done.

I do not like the idea of a "scholarship," because it would be extremely difficult to select the most deserving men from the many applicants scattered through the whole United States. Scholarships should be attached to individual institutions, but I take it for granted that it is the general opinion to make this memorial one of national character.

To place a "monument," such as a bronze statue of Procter, in some public and well-chosen locality would be highly appropriate.

Yet, of all plans submitted, I favor most the proposition of Dr. Fr. Hoffmann, to found a memorial medal "to be granted in recognition of superior discoveries or literary accomplishments in the domains of theoretical and applied pharmaceutical sciences and arts."

I am also in favor of Dr. Hoffmann's plan to make this prize medal a memorial for both Procter and Squibb, naming it the "Procter-Squibb memorial prize medal."

I am inclined to think that both these men, if their opinion could be learned, would much prefer to have their names and memory perpetuated in this form, than to have monuments erected in their honor.

While these are my personal views, I desire to say that whatever may be done to do homage to the memory of our really great men will find my most hearty support. W. SIMON.

DEAR SIR:—I am in hearty sympathy with the movement to establish a Procter memorial as the climax of any celebration of the fiftieth anniversary of the A.Ph.A. Our Association now has a considerable fund, which was made secure a few years ago for the purpose of husbanding it for the purpose of research. With this as a nucleus it ought to be possible to erect at Washington a creditable building devoted to research, on condition that the government maintain it and support its officers. Besides having a staff of government scientists representing the principal branches of pharmaceutical science, including pharmacology, such a building could be made the home of the U.S.P. Revision Committee. One laboratory in such a building might be dedicated to Procter, another to Squibb, etc.

To have a bust made of Professor Procter, or a portrait painted or any other expression of appreciation of Professor Procter's services is a duty which the Philadelphia College of Pharmacy and its alumni owe their teacher, and in which they certainly do not need the assistance of others. A statue seems out of the question, and of pharmaceutical medals we possibly have sufficient. As a nation we cannot honor Procter or Squibb, or both, more than by the erection of a research laboratory devoted to solving problems which the Revision Committee must so largely leave unsolved.

Since writing the above suggestion, I see that Professor Arny has

made a similar one. I heartily second his suggestion, with the proviso that the American Pharmaceutical Association erect the building and turn it over to the government *on condition that the U. S. Government pledge itself to properly support it.* The co-operation of the government seems to me of the greatest importance.

EDWARD KREMERS.

RECENT LITERATURE RELATING TO PHARMACY.

WEST INDIAN SANDAL OIL.

The plant Amyris balsamifera yields an oil entering commerce as named above. This oil has specific gravity ·962, is dextrogyre and fractionates with six portions, the first fraction distilling in vacuo at 139°–147° C. and the sixth at 170°–174° C. The second and fourth fractions are most abundant, and the two analyze to $C_{15}H_{24}$ and $C_{15}H_{24}H_2O$ respectively. The oil yields with halogen acids a series of derivatives, the chlorine derivative (yield 17 per cent.) being identical with cadinene dihydrochloride, $C_{15}H_{24}2HCl$, and the other halogen derivatives being analogous cadinene compounds.—E. Daussen, *Arch. Ph.*, 1900, 144. H. V. ARNY.

SANDALWOOD OIL.

The oil of Santalum album, examined by M. Guerbet (*J. de Ph. et Ch.*, 1900, 225), has specific gravity 0·9867 and had specific rotating power — 21·16°. Saponification separated from it 3 per cent. of the following acids: Formic, acetic, santalic and teresantalic, all found in the oils as esters. Santalic acid, $C_{15}H_{24}O_2$, is a viscid, colorless liquid boiling at 210°–212° C. under 20 millimetres pressure, insoluble in water, but soluble in alcohol, and is so feebly acid that it can be freed from its salts by CO_2. Teresantalic acid, $C_{10}H_{14}O_2$, occurs in large colorless prismatic crystals melting at 157° C., and forms crystalline salts. The unsaponifiable portion of the oil yielded, on repeated fractional distillation, 6 per cent. of sesquiterpenes, santalenes α and β respectively, the former boiling at 252° C., the latter at 281°. Both are lævogyre. Also two alcohols, santalol α and β, 80 per cent., the study of which is not complete. Lastly, there was obtained from the oil by precipitation with semicarbazid hydrochlorate 3 per cent. of an aldehyde, santalol, $C_{15}H_{24}O$, a colorless liquid of peppery odor, boiling at 180° C. under 40

millimetres pressure, and forming a crystalline semicarbazone, melting at 212° C. On oxidation with chromic acid the aldehyde yielded santalic acid. H. V. A.

THE CHARACTER OF DROPS.

An interesting contribution to this subject is an article by F. Eschbaum (*Ber. Dtsch. Ph. Ges.*, 1900, 91). He gives table of weights of drops of almost every kind of liquid, and from his experiments has deduced the following equations:

(1) To secure uniform drops it is necessary that the liquid drop from a spherical surface of estimated radius. He shows that the influence of the surface of the vessel from which the liquid is dropped comes from the readiness of this surface to form a curved segment of liquid, which the investigators call the meniscus of the drop. This aggregation of liquid continues to collect on the dropping surface of the container until its adhesive power is overcome by the force of gravitation, hence the actual formation of the drop is solely influenced by cohesion and gravitating force. For instance, he finds that, taking two tubes of the same calibre, one of which is very thin walled, the thicker the wall, the larger the drop; in other words, the outer circumference of the dropping surface is the sole determinant of the size of the drop. This continues with increased circumference of tube until the maximum of a drop of water is attained. This maximum drop he finds weighs 0·2330 grammes.

(2) The weight of a drop of a mixture of two liquids is always between the weight of its two components.

(3) The weight of a drop of a solution of a solid body, such as salts, bases, acids, extractive matter, and also of a solution of a gas, is practically the same as that of its solvent. In this connection the writer discovered an interesting fact, that, usually, the weight of a drop of a saturated solution of a salt is less than that of a drop of water.

(4) That the rapidity of dropping from the same container, or variation in temperature during dropping, while exerting a certain influence, is not sufficient to be considered in practical work.

(5) The size of a drop varies according as the liquid is dropped from a full bottle or from one partially full.

Dropped from a tube of diameter 6·63 millimetres, measured from

one outer edge to the other, a drop of water weighed 0·1 gramme; a drop of alcohol, specific gravity 0·831, weighed 0·033 gramme; one drop of ether weighed 0·0238; one drop of chloroform weighed 0·0376 gramme. H. V. A.

KOLA NUT.

At a recent meeting of the German Pharmaceutical Society, the kola tree and its fruit were discussed from two standpoints by K. Schumann and by L. Bernegan. From the mass of detail the following facts were gleaned:

The fruit of kola weigh as much as 2 kilos, and since a large number of fruits are produced by one tree, its branches would be subjected to much pressure were it not for a provision of nature, namely, from the trunk spring many of the flowers (Cauliflorie), thus throwing much of the burden on the sturdy trunk. The flowers are of two kinds, in both of which the petals are missing, the calyx assuming a pink color which attracts fertilizing insects. The flowers are very odorous (vanillin-like), while the fruit smells like the Marechal Neil rose. Within the pulpy fruit four to eight seeds or nuts are found. These nuts are used by native Africans only when fresh, and large quantities are sent to the Brazilian negroes, who likewise insist on receiving undried nuts. Accordingly, they are exported to Brazil carefully packed in leaves of Cola cordifolia, and by this means the seeds can be kept four weeks. The price of the nuts ascends in proportion to distance from place of collection; for instance, at place of collection in Ashanti, 2,000 nuts cost 6 marks; in Salaga they cost 30 marks, while in Bahia, Brazil, the same quantity costs 400 to 600 marks.

The tree grows sometimes 15 metres high, begins bearing fruit in its eighth year, and bears fifty years. The wood of the branches is used by the negroes for cleaning teeth, while a decoction of young branches is used as a gargle by the negro children.—*Ber. Dtsch. Ph. Ges.*, 1900, 67. H. V. A.

PURIFICATION OF WATER.

Water can be freed of bacteria by means of minute quantities of the halogen elements, and a study of this is reported by F. Malmejac (*J. Ph. et Ch*, 1900, 364). To successive quantities of very impure water, chlorine, bromine and iodine were added, each in proportion of 0·1 milligramme to the litre. The reagent was allowed

to act half an hour and the excess removed with sodium thiosulphate. Comparison of the purified waters with the impure sample showed that, while the purification effected little change in the amount of organic matter tested with permanganate, ranging from 4·4 milligrammes per litre in the impure to 3·2 in that purified with chlorine, and also slight alteration in the amount of ammonia, ranging from 0·24 milligrammes per litre in the impure to 0·16 in the chlorinated, the destruction of bacteria was most notable, the amount in the original water counted on nutritive gelatin after eight days being 17,500 (in what quantity?—Ed.); in chlorine purified water, 300; in bromine purified water, 190, and in iodine, only 90. The writer thus gives preference to alcoholic solution of iodine as a purifier. Attention is called to the fact that all the water examined developed oxygen on standing, the impure original having 9·6 milligrammes per litre after one day and 12·6 milligrammes after twenty days; the chlorinated, 11·6 milligrammes after one day and 15·3 milligrammes after twenty days. These represent the extremes.

H. V. A.

THYMOTAL.

A new remedy against *Anchylostomum duodenale.*

Thymol is known for its antiseptic properties. It is therefore administered, internally, especially against that dangerous parasite, the *Anchylostomum duodenale,* when Ext. Filicis mas æther, Pellietierin, Kamala et t. g. fail.

Anchylostomum duodenale is one of the special plagues of warm countries, especially of Italy. Italians spread it sometimes. Frequently it becomes of an epidemic character. It is one of the causes of chlorosis, and can become fatal, under certain circumstances. The "worm" reaches a length of 18 millimetres. The sexes are separate. West India is especially infested with it. How well it is provided for its deadly work can be judged from a drawing made by Professor Leuckardt, reproduced in "Practisch wichtige microscopische Objecten," page 298 of Hager-Mez' "Das Microscop," Berlin, Julius Springer, 1899.

The administration of thymol has bad after-effects; it causes dizziness, intoxication, nausea.

Applying the same process whereby guajacol loses its strongly aromatic and burning taste, becomes tasteless, but preserves its medical properties, *e. g.*, converting it into a carbonate.[1] Mr. J. F.

[1] E. Schmidt, "Ausf. Lehrb. d. Pharm. Ch.," II, page 938.

Pohl, apothecary at Paramaribo, states that he succeeded in converting thymol into thymol carbonate, a nearly tasteless, colorless, crystalline compound, varying but little in its melting point from thymol (thymol, 50°–51°; thymol carbonate, 49°; details were not given as to how this estimation was made), but considerable in its boiling-point (thymol, 230°; thymol carbonate, "over" 400°).

This new remedy is not dissolved in the stomach; causes, therefore, no dizziness nor nausea, and is very effective against those intestinal pests where Ext. Filix mas. cannot be taken.

We regret to state that Mr. Pohl has added to our already unbearable burden of new remedial names another name; has put a mysterious shroud around it and called the compound thymotal, wherefore he cannot show a good cause of doing this.

The remedy has the usual support of half a dozen doctors.

J. B. NAGELVOORT.

THEOBROMA CACAO.

Th. Peckolt's "Medicinal and Useful Plants of Brazil," which appeared in the *Berichte der deutschen Pharmaceutische Gesellschaft*, opens a new chapter in botanical materia medica, and it is to be hoped that the articles will be gathered into one volume.

From the closing article the following data on Theobroma Cacao is gleaned:

The seeds were not used by the native Brazilians until after the advent of the Europeans, the natives employing only the sweetish pulp, from which they fermented a beverage. Since the seeds were used by the Mexicans and Peruvians from primeval days, there is evidently no ethnological connection between the west coast Indians and those of Brazil.

The tree is considerably cultivated at the present time, for, by reason of the low price brought by coffee and the expense of its culture, many planters are turning to cacao, 600 trees on a hectare (2½ acres) of ground bearing, after five years, 4,500 to 4,800 kilos dried seed each year. The frequency of crop and size of seed depend on climatic conditions, in hot places two crops a year being the rule. In Cantagallo the average fruit weighed 220 grammes and yielded 27·5 grammes dried seed; while in Rio—a warmer place—the fruit averaged 330 grammes, divided as follows: Rind,

204 grammes; pulp, 36 grammes; seed, 90 grammes, which dried to 48·6 grammes.

The rind yielded fat, resin, albumen, tannin, glucose, mucilage (4 per cent.), water (81 per cent.), ash (2 per cent.) and theobromine (0·6 per cent.).

The mucilage makes the rind a valuable substitute for ground flaxseed, which spoils very quickly in Brazil. It is also of use as fodder.

The pulp contains tartaric acid (1 per cent.), glucose (3·8 per cent.), albumen (0·5 per cent.), mucilage (1 per cent.), pectin and extractive (7 per cent.), ash (1 per cent.). The alcoholic liquor produced from it is very palatable and ferments to a good vinegar.

The fresh seeds contain water (46 per cent.), fat (17 per cent.), theobromine (0·2 per cent.) and ash (1·25 per cent.).

The fresh leaves contain water, fatty oil, resin, theobromine (0·07 per cent.), tannin, extractive and 0·2 per cent. of a substance tasting like glycyrrhizin and resembling it in analytical reactions.

H. V. A.

FORMATION OF CINCHONA ALKALOIDS.

Believing that the alkaloids were developed in the leaves, just as is starch, Dr. J. P. Lotsy experimented at the Java governmental cinchona plantations as follows: Leaves were divided at the midrib, the half with midrib being either left on tree or immersed in water, the two halves being assayed at different times, control experiments having shown that the two halves of the same leaf, examined at the same time, yielded approximately the same amount alkaloids. In some cases the half first examined was rich in alkaloids, while the half left on the tree was, within twelve hours, free from alkaloids. That this disappearance was due to migration of the alkaloids into the bark and not to dissociation of same by leaf processes was shown by the fact that, if the remaining half were removed from tree, the diminution of alkaloidal strength was never observed; but, on the contrary, a leaf originally free from alkaloids developed same on exposure to light after being removed from tree. This is of importance, because, while some experiments showed the emptying of alkaloids from a leaf within twelve hours, in other cases, twelve hours after the first half showed no alkaloids, the second half yielded a considerable quantity.

The percentage of alkaloids in young succirubra leaves is ten times greater than that of the old leaves, but the actual amount in each leaf is not as great. The average tree, having 10,000 leaves weighing about 5 kilos when dried and yielding about $\frac{1}{10}$ per cent. alkaloids a day, produces about 2 kilos of alkaloids a year (5 grammes a day), a quantity much greater than that obtained each year from the bark of an average tree. This shows the leaves fully capable of producing all the alkaloids we find. The excess in formation is easily accounted for: (1) The leaves are never completely emptied each day. (2) The unfavorable weather reduces alkaloidal output.

The theory of leaf formation of alkaloids is strengthened by the facts that the petioles are richer in alkaloids than the blade, that the branch bark contains more than the trunk bark, that the root bark is practically free from alkaloids. The leaves, however, contain no crystalline alkaloids, hence no quinine. This is explained by saying that the leaves produce a fundamental and soluble alkaloidal base, which is elaborated into the true alkaloids when being stored in the bark.—*Ber. dtsch. Ph. Ges.*, 1900, 124.

H. V. A.

ASSAY OF VOLATILE OIL IN AROMATICS.

Distil an alcoholic percolate of the drug with steam, taking care that distillate represents an aliquot part of the drug. Place 100 c.c. of this distillate, to which a few drops of diluted sulphuric acid is added, and which must not contain more than 50 per cent. of alcohol, in a special flask, having a lower bulb of 95 c.c. capacity connected by a narrow neck, graduated from 98 c.c. to 100 c.c. in fractions of ·05 c.c., to a second bulb holding 25 c.c. up to its neck, which in turn connects with a third bulb of value in agitation. The liquid in the flask is cooled in water to exactly 20° C. and an exact reading is taken, after which petroleum ether (sp. gr. 0·640 to 0·670) of same temperature is added up to the 125 c.c. mark. In this way the flask contains two distinct layers of liquid, say the aqueous up to 100 c.c. and the benzin up to 125 c.c. The mixture is vigorously shaken five minutes and then allowed to cool to 20° C., when it is noticed that the oil formerly present in the aqueous layer has been absorbed by the benzin, increasing volume of the latter the amount of oil present, as proven by experiments of the author. —Dr. Neuman Wender, *Ph. Post.*, 1900, 344. H. V. A.

THE ETHER TEST FOR SCAMMONY.

Of two consignments of the same scammony sent from Beyrouth in Syria—one to Germany, the other to France—the former was returned as not standing the ether solubility test of the pharmacopœia, while the French specimen was found perfectly satisfactory. This led P. Guigues (*J. de Ch. et Ph.*, 1900, 529) to investigate, and he found the cause of the contradictory reports in the variable quality of commercial ether; even that labelled "pure." He finds many of the most reliable ethers contain water, even to 1·60 per cent., and the slightest trace renders scammony insoluble. Most contain alcohol, which renders the resin easily soluble even when water is present in the solvent. Another curious point is that in some cases the resin dissolves freely in a certain quantity of ether and precipitates when excess of the solvent is added. From these several facts the writer concluded that the test should be carefully studied and revised, with special reference to quality and quantity of the ether employed. H. V. A.

PHENYLHYDRAZINE REACTION FOR URINE.

The difficulties of above test, which is most valuable for detecting minute quantities of urine, can be obviated as follows: Put in ordinary test-tube equal amounts (about size of a pea) of phenylhydrazin, HCl, and crystallized sodium acetate. Fill tube with the urine and cork, not allowing finger to come in contact with the phenylhydrazin, which is a dangerous poison to the blood. Shake the mixture till the salts are dissolved, then remove stopper, place tube in boiling water, immediately removing flame. Allow the test-tube to remain in the water till completely cold, preferably over night; then remove precipitate with pipette and examine microscopically. The crystals rarely appear as striking as pictured in the books, but the presence of sugar can be safely established if the precipitate is intensely yellow and crystalline. By this means 0·01 per cent. sugar can be detected. Practice is essential to diagnosis, hence the beginner is urged to first experiment with urine to which glucose has been added.—Dr. F. Eschbaum, *Schw. Woch. f. Ch. und Ph.*, 1900, 214. H. V. A.

EDITORIAL.

PARLIAMENTARY LAW IN ASSOCIATIONS.

At the different association meetings there are many members who are more anxious for the good of their professions than are conversant with parliamentary law. The result is that when the presiding officer is more or less familiar with the law and anxious to carry out the law these members who are making motions and amendments contrary to such laws sometimes find that they are declared to be out of order; and hence are inclined to consider such rulings to be unjust and not in accord with the good of the cause they are expounding.

There are very few presiding officers of professional bodies who are thoroughly conversant with parliamentary law and able to carry on a meeting in the proper way. This arises because the presiding officers are usually selected on account of their scientific or literary attainments—as they undoubtedly should be—and not because of their being good parliamentarians. It is true that, as a rule, at the meetings of professional bodies no serious difficulties confront the chair. However, difficulties do arise and chairmen sometimes lose their heads, and things are sometimes said and done which are unwise and unfortunate, but which fortunately are usually expunged from the records and not published.

Observations on the actions of various bodies show that each body should have a presiding officer to direct its business affairs who is familiar not only with the needs of the body, but who is also a good parliamentarian. Professor Lloyd, when President of the American Pharmaceutical Association (Proceedings, 1888, p. 15), made the following recommendation, which is deserving the consideration of all associations, as it would tend unquestionably to facilitate the business of the organizations and permit the ablest men to be selected for the most honorable positions of these associations, and who are not then burdened with the difficulties of presiding at all the meetings.

Professor Lloyd says: "Sometimes it may be desirable to elect as your president a man totally inadequate in the direction of parliamentary tactics, and of little value as a presiding officer. Whatever good reason may induce such a selection, I think that it will not be disputed that it is necessary to always have an accomplished

parliamentarian as presiding officer, in order to facilitate the work of the organization. I can refer to this matter graciously, for I reflect my own shortcomings in doing so. The good judgment of this Association wisely associated with me a superior parliamentarian, capable, willing, obliging, and I thank you for the consideration shown me; but especially am I indebted to this gentleman, Mr. M. W. Alexander, who has so discreetly and acceptably conducted your meetings.

"I believe that it would be well to honor such men and serve yourselves by extending them lengthened positions in presiding over us, and create in our body a new office, a presiding chairman, who can both preside over the general meeting and fill vacancies in the absence of the chairmen of the sections.

"The President elected by reason of a special fitness for other labors will then have time to attend to his peculiar duties; he may appoint committees, etc., etc., during your meetings without the distractions attending the chairmanship; the conducting officer, elected by you at stated periods because he is really capable of being a parliamentarian, will conduct your deliberations in a proper manner. He will become acquainted with faces, names and methods, and facilitate the order of your meetings. * * * * I will admit that some of our Presidents are capable parliamentarians, but it is sometimes desirable to elect men without such accomplishments. In support of this opinion, since writing this section, I have reviewed an editorial article by Dr. Fred. Hoffmann on the subject in the *Pharmaceutische Rundschau* (September, 1885), and extract the following sentence: 'A thorough familiarity with the subject matters of the deliberations, and the rare gift of wise tact, of quick and good judgment, and of energy, are requisites for managing large conventions with success.' If men with these talents and ability, and with comprehensive knowledge, can be placed, or have been found, at the helm of the association, it certainly would be conducive to the best interests and efficiency of its annual meetings to retain them. If it is not considered advisable to add this new officer, I strongly urge that the Vice-Presidents be selected for the purpose of filling this position, and that the President-elect be relieved from the detail work of conducting the meeting, giving his entire attention to the real work of his office."

The mode of procedure in selecting the presiding officers in the

American Association for the Advancement of Science is one which commends itself to all professional organizations, as it tends to relieve the President of performing more than one series of duties each year. The President is elected at one meeting, presides at the following meeting and delivers his presidential address the next succeeding year. This, however, does not do away with the necessity of his presiding at one of the meetings, and, should he not be a parliamentarian or desire to qualify himself as such, places him in an unpleasant position.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the forty-eighth annual meeting, held at Richmond, Va., May, 1900. Baltimore: 1900.

A succinct account of the Richmond meeting of the American Pharmaceutical Association has already been given the readers of this JOURNAL (see Vol. LXXII, p. 291). The full account of the meeting, with papers and discussions as well as a number of addresses, is given in 344 pages of the proceedings just published. In 517 pages is given the report on the progress of pharmacy, from July 1, 1899, to June 30, 1900. The remainder of the proceedings is devoted to a list of members, constitution and by-laws and other matters of interest to members. There are few, if any, associations in which the members receive greater value from their membership than that of the American Pharmaceutical Association. From the viewpoint of a business transaction, it is one of the best investments the apothecary can make.

INORGANIC GENERAL MEDICAL AND PHARMACEUTICAL CHEMISTRY. Theoretical and Practical. A Text-Book and Laboratory Manual, containing Theoretical, Descriptive and Technological Chemistry; Class Exercises in Chemical Equations and Mathematics; and Practical Manufacturing Processes for Five Hundred Chemical Preparations, with Explanatory Notes. By Oscar Oldberg. In two volumes. Chicago: Chicago Medical Book Company. 1900.

For the student who desires to get at the fundamental principles underlying theoretical chemistry, the work of Professor Oldberg will be a decided help. The language is succinct, clear and to

the point. The author treats well of such important subjects as the atomic theory; chemical polarity; the relative intensity of the chemical energy of different elements; atomic valence; chemical notation and nomenclature; the laws and conditions which dominate the course of chemical reactions; oxidation and reduction; the periodicity of the properties of the elements; the intimate relations of all these to each other and to atomic mass; and their bearings upon the practical problems of chemical work. There are also included adequate instruction, rules and examples, designed to enable the student to fully master the all-important practical uses of chemical equations and mathematics, seven chapters being devoted to these subjects.

Volume I is divided into three parts and includes chapters on the following subjects: Part I. Elementary Theoretical Chemistry: (1) Introductory, Some Common Kinds of Matter; (2) Atoms, Molecules and Chemism; (3) Preliminary Experiments Showing Physical Signs of Chemical Action; (4) The Chemical Elements; (5) The Law of Definite Combining Proportions and the Atomic Theory; (6) Chemical Polarity; (7) The Relative Intensity of the Chemical Energy of the Elements; (8) Atomic Valence; (9) Atomic Polarity-Value; (10) Chemical Notation; (11) Chemical Nomenclature; (12) Classification of Chemical Compounds—Binary Compounds; (13) Hydroxides, Acids and Bases; (14) Salts; (15) The Relations of Oxides, Acids, Bases and Salts to Each Other; (16) Structure of the Metallic Oxygen-Salts of the Common Acids; (17) Chemical Reactions; (18) Oxidation and Reduction; (19) The Forces and Conditions which Dominate the Course of Chemical Reactions; (20) How to Write and Balance Ordinary Chemical Equations; (21) How to Balance Equations Representing Reactions of Oxidation and Reduction; (22, 23, 24) Examples in Oxidation and Reduction; (25) Atomic Polarity-Value as an Aid to the Verification of the Structure of Molecules; (26) The Periodicity of Properties of the Elements; (27) A Recapitulation of Fundamental Facts, Definitions and Hypotheses.

Part II. Elementary Descriptive Chemistry: (28) Order of Study of the Elements and their Compounds; (29–67) The Elements and their Compounds, including the Ammonium Compounds and Metallic Salts of the Organic Acids. Part III. (68, 69) Stoechiometry.

The contents of the second volume include:

Part I. General Principles and Methods Applicable in the Production of Inorganic Chemical Preparations: (1) Choice of Methods and Materials; (2) Crushing and Powdering; (3) Dry Chemical Processes; (4) Solution: Its Nature, Causes and Effects; (5) Solvents, Solubility, Solutions; (6) The Clarification of Liquids, Strainers, Presses, Filtration; (7) Evaporation; (8) Distillation; (9) Crystals and Crystallization; (10) Crystallizations from Solutions; (11) Dialysis; (12) Precipitation; (13) Chemical Solution, Wet Oxidation, Wet Gas Operations; (14) Uses of Unfinished Products; Purification of Crude Chemicals. What to do with Damaged Products. Profitable Chemical Work; (15) The Preservation of Medicinal Substances; (16) Solubilities of Chemical Compounds in Water and in Alcohol; (17) The Densities of Solids and Liquids. The Mohr-Westphal Balance; Hydrometers; Pycnometers, etc.; (18) Rules for Making Solutions of any Given Strength, and for Diluting, Fortifying and Mixing; (19) Laboratory Furniture and Apparatus; (20) Laboratory Rules and Precautions; What to do in Accidents; How to Clean Apparatus. Part II. Laboratory Manual of Inorganic Chemical Preparations: Introductory; Weights and Measures; Water; Acids; Other Preparations; Tables; Index.

The chapters on Chemical Polarity, Atomic Valence and Atomic Polarity-Value, in Book I, are particularly valuable. The application of atomic valence in balancing equations is of great value, particularly in the consideration of oxidation equations. It is doubtful if there are any formulæ or reactions which are not in agreement with the doctrine that no atom can gain increased combining value except at the expense of some other atom or atoms and that the gain and the loss exactly balance each other. The consideration of the nature of atoms underlies the whole superstructure of practical chemistry. Part I is based on the most advanced chemical theories, and the author has wisely devoted over 300 pages in the consideration of the fundamental matters connected with theoretical chemistry. The remainder of Part I is given to the consideration of the elements and the stoechiometry of inorganic chemistry. Volume II is devoted to the consideration of actual laboratory operations in the production of inorganic chemicals and the making of 500 inorganic chemical preparations. The author has shown an assimilation of the subject matter and an originality of treatment

that is pleasing, and there can be no question but that students, investigators and manufacturers will find that these volumes contain just such information as is frequently lacking in many of the text and reference books on this subject.

King's American Dispensatory. New edition. Entirely rewritten and enlarged. By Harvey W. Felter and John Uri Lloyd. Two-volume edition, royal octavo, containing together 2,284 pages, including complete indices. Cloth, $4.50 per volume, postpaid. Sheep, $5 per volume, postpaid. The Ohio Valley Company, publishers, Cincinnati, O.

Volume I of this work appeared in 1898 and a brief mention of it was made in this Journal, 1898, p. 580. Volume I includes substances from A–G and contains 904 pages. Volume II includes substances from G–Z inclusive and contains 1,267 pages. Volume II is an improvement over Volume I in editorial work as well as in the use of paper and typographical work. The treatment of the eclectic materia medica is the best part of the book, and it is in this particular field that the work is a valuable contribution to materia medica. The student and investigator who is anxious to know more about the possibilities of the cultivation of medicinal plants in America will find numerous valuable hints, as under podophyllum: "May-apple is hardy and will thrive in fence corners of cultivated fields, often resisting the advances of agricultural improvements, when other common fence-weeds have been exterminated. It is not, as is the case with many other valuable medicinal plants, likely to be soon eradicated." Under hydrastis we read: "With hydrastis, however, the opposite is true; the plant disappears as soon as the ground is disturbed by the settler." There are many things recorded that one would have difficulty in ascertaining, as literature is so scattered and references become more and more difficult to look up. The new edition of King's Dispensatory will be much appreciated by those who have been anxiously waiting its appearance and it will prove a valuable adjunct to the reference library of the physician and pharmacist.

Cinchona Barks of the New York Market was the subject of a paper by J. H. Stallman at an evening meeting at the College of Pharmacy of the city of New York on January 15th. The paper was discussed by Professor H. H. Rusby, well known for his studies on cinchona, coca and other vegetable drugs, and Adolph Henning.

PHARMACEUTICAL MEETING.

The fifth of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1900–1901 was held Tuesday, February 19th. Theodore Campbell, a local pharmacist and a member of the College, presided.

The first speaker was Dr. Wm. C. Alpers, of New York City, who is well known for his active interest in pharmaceutical matters in general. Before taking up the main topic of his paper, Dr. Alpers said, in referring to the oft-repeated statement that pharmacy is not in a satisfactory condition, that if any advancement is to be made, the impetus must come from the colleges of pharmacy. He therefore urged the students who were present to strive to make the most of their opportunities while in college and to strive for high ideals. He said that there is something greater than pennies, that knowledge is a greater and nobler capital than dollars and cents. It is a capital which neither sickness nor misfortune can take away. He said he had little respect for the man who stoops to the gutter to find a penny, but high regard for the man who looks up to the stars for his ideals.

Then taking up the subject of his paper, which was entitled "Remarks on a New Cold Cream and Other Ointments," the speaker gave a practical demonstration of his method of procedure (see page 117). One point which was brought out by the speaker and which he especially emphasized was that of using chemical thermometers for operations requiring heat, this being a point that is too often neglected by pharmacists.

In reply to a question by Wallace Procter as to whether cold cream made by the proposed formula retains the water better than the official ointment, Dr. Alpers said that, so far as his knowledge went, it did, his experience having been with samples only a year old, which as pointed out had kept perfectly.

F. W. E. Stedem said that his only criticism on the official cold cream was the presence of borax, which interfered with its use as a basis for mercurial salts.

E. M. Boring also remarked upon this point and said that he invariably omitted the borax. His method of procedure is to melt together the spermaceti, white wax and expressed oil of almond, and to allow to cool over night, the rose water being incorporated

the next day. Mr. Boring also said that he endeavored to keep his ointments in a cool place in summer and that he did not experience much difficulty in keeping them. Continuing his remarks, Mr. Boring said that until comparatively recently paraffin had not been favorably considered as a basis for ointments containing active ingredients, but that Wilbert had shown that by incorporating a considerable portion of water with the ointment base this difficulty was overcome. This point, he said, took his memory back to war times when the Government rejected a considerable quantity of paraffin on account of its rancidity.

Remarking on this point, Dr. Alpers said that of course it must be borne in mind that a much purer article is obtainable now.

With regard to the presence of borax in the formula proposed by him, Dr. Alpers said it was desirable to retain it, as it assisted in the mixing of the two solutions and also added to the appearance of the finished preparation.

Mr. Campbell said that he had been using a formula somewhat similar to the one given by Mr. Alpers and that it yielded a satisfactory preparation.

M. I. Wilbert read a paper on "Oxygenated Petrolatum," and gave a practical demonstration of its mode of preparation. In the first step certain proportions of paraffin oil and oleic acid are mixed together, the resultant solution being of a cloudy appearance; and to this, spirit of ammonia is added when the solution clears up. This solution acts as a solvent for many medicinal substances such as camphor, salol, phenol, creosote, ichthyol, etc., and is especially adapted for use in liniments. It furnishes an ideal solvent for iodine, as it prevents the iodine from evaporating, also facilitates its absorption, and may be applied several times a day without producing blistering effects.

Replying to a query as to a rise of temperature when iodine is added to the preparation, Mr. Wilbert said that it was very slight.

A very interesting and suggestive paper on "Why Do Syrups Spoil?" by Alfred I. Cohn, New York City, was presented in abstract on behalf of the author by Prof. Henry Kraemer (see page 119).

The next speaker introduced was Wm. R. Lamar, of New York City, who read a paper on "Assay of Coca" (see page 125).

Prof. Jos. P. Remington said that he was pleased that Mr. Lamar had taken up this subject, as the Pharmacopœial Revision Com-

mittee desires to have work of this kind, as there is an evident need for standardized drugs. He said that ten years ago there was a cry for standardized preparations, but that the committee found difficulty in adopting methods which could be utilized by the pharmacist as well as by their originators.

Dr. Alpers said that he was also much interested in the subject of the paper. He said that a number of years ago he had tried a number of assay processes using various solvents. He asked whether by the use of kerosene for extracting coca there was any trouble from the introduction of higher paraffin oils, as this appears to be a rather variable article, having different flashing points in different states. In reply, Mr. Lamar said that he had had no trouble in this respect, that he used an ordinary 150 test oil.

Professor Remington spoke of the small percentage of alkaloid in the drug, and referred to the question of the importation of crude cocaine into this country for the manufacture of the alkaloid. Mr. Lamar spoke on the tariff regulations and said that there was a duty on both the purified and crude alkaloid, and that on account of the heavy duty on the latter, only a limited quantity is imported. He also said that the crude article (alkaloid) contained a very small percentage of the true alkaloid.

Dr. C. B. Lowe referred to some assay experiments which Dr. Rusby had made some years ago in South America, which led to the belief that a larger percentage of alkaloid could be obtained from leaves which were comparatively fresh.

Lyman F. Kebler said that he had examined a sample of the crude alkaloid which assayed 96 per cent., and that he knew of one manufacturing firm which used this article exclusively for the manufacture of their cocaine.

Mr. Lamar said that the problem of the purity was an important one and that the question to be determined was whether the alkaloid in question was pure or whether it contained by-products. His experience had been that it contained a number of impurities.

Dr. H. C. C. Maisch presented a paper on "Gum Mastic," which will appear in a later issue of this JOURNAL. The author, having a sample of mastic submitted to him which was very light in color, and suspecting that it was a substitution product, submitted it to a comparative test with other commercial samples, and it was found that they were all identical.

In discussing this paper Professor Lowe referred to the history of mastic, stating that it was of great interest, and, to a large extent, that of the island of Scio, from which the drug comes.

He said that in the fourteenth century a Genoese family by the name of Laccaria obtained a concession from one of the Greek emperors (to whom the island was then tributary), and settled there, being joined by many of the nobles of Genoa, who relinquished their family names, taking the general name of Ginstiniani, and forming a society called the Mano. This company, which was somewhat like the former East India Company, taking advantage of the weakness of the emperor, declared themselves independent and governed the island to suit themselves, making their own laws, coining their own money and fighting their own battles. The island was held by this company with somewhat varying fortunes for some 250 years, when it was conquered by the Turks, who hold it to this day.

When under the control of the Mano, the annual revenue from mastic amounted to the large sum (for those days) of about $69,000.

Mr. Kebler submitted a sample of the drug which he said was whiter than the specimens accompanying the paper. He said the statement in the U. S. P. about it being brittle will not hold. He further remarked that he did not attach as much importance to the acid number as is ordinarily done, but still he was in favor of using every available method.

In speaking of the use of mastic in medicine, Jos. W. England said that mastic was used in connection with aloin in the Lady Webster pill, to retard the action of the aloin until it reaches the intestines.

Mr. Kebler remarked, in connection with the subject of indicators, that distilled water frequently gives an alkaline indication with cochineal, and on this account causes a variation in the assay figures in titrating for alkaloids.

The same speaker then called attention to the impurity of the gum arabic on the market, and said that he had a great deal of difficulty in obtaining a pure article. Aqueous solutions of samples which he had examined had a reducing action on Fehling's solution. He said that, of course, it is admitted that inferior grades do this, that is, they contain some sugar which reduces the copper solution.

Mr. Lamar exhibited an ebulliscope, an instrument of French

manufacture, which is used extensively for determining the percentage of alcohol in wines and liquors. He said that concordant results could be obtained with it, and in this respect was more satisfactory than some of the other methods which are used. In order to show the comparative accuracy of the method, he gave the following data: In one case an alcohol which had a specific gravity of ·9867 as determined by Squibb's specific gravity bottle, this being equivalent to 10·08 per cent. by volume, gave a percentage of 9·7 per cent. by volume with the ebulliscope, a difference of ·38 per cent. A second sample contained 19·34 per cent. by volume according to the Squibb apparatus, and with the ebulliscope, 19·7 per cent. by volume, these figures representing extremes of variation.

Mr. Procter, having tried the use of paraffin for denarcotizing opium as suggested by Gordon (AMER. JOUR. PHARM., 1900, p. 576), exhibited a specimen of the residual paraffin which was considerably colored. The resulting tincture was re-paraffined, but the second product was similar in appearance to the first.

A vote of thanks was tendered the authors of the papers for their presentation.

At the next meeting, on Tuesday, March 19, Prof. Virgil Coblentz, of the College of Pharmacy of the City of New York, will give a lecture on "Recent Developments in the Study of the Relationship between Chemical Constitution and Physiological Action of Organic Compounds."

FLORENCE YAPLE,
Secretary pro tem.

NOTES AND NEWS.

COMMERCIAL PHARMACY will receive attention at the hands of a number of competent lecturers at the University of Michigan on each Wednesday, from February 13th to May 29th, inclusive.

LEHN AND FINK, whose establishment in New York City was burned out recently, are temporarily located at 77–79 Beekman Street, and expect to occupy their new building at 120 William Street by March 1st.

A NEW RESEARCH LABORATORY.—The twentieth century will no doubt be a century of progress in applied science, and one of the developments will be the research laboratory, where investigators will carry on researches which have practical objects in view. Parke, Davis & Co. intend to build an elaborate science laboratory which will be devoted exclusively to research work in chemical and biological directions.

THE AMERICAN JOURNAL OF PHARMACY

APRIL, 1901.

CONTRIBUTIONS FROM H. M. GORDIN.

I. THE ASSAY OF CRUDE DRUGS.

The first step in the alkaloidal assay of drugs and galenical preparations consists in the extraction of the alkaloids from these sources. The exactness of such an assay will depend in the first place upon the completeness of exhaustion of the respective sources, and in the second place upon the exactness of the method which is employed for the estimation of the isolated alkaloids. With regard to this estimation, the method which I proposed some time ago[1] seems to work very well with all alkaloids except those which are not precipitated by Mayer's or Wagner's reagents in very dilute solutions (coniine), or those that are only precipitated by these reagents in presence of a very large excess of acid (colchicine).[2] In applying this method to the assay of drugs, it is often found that upon addition of the above-mentioned reagents the precipitate obstinately refuses to separate out even upon prolonged shaking. In such cases the addition of a little talcum powder, which of course must be perfectly neutral, and a little shaking will speedily throw down all the precipitate, leaving a perfectly transparent supernatant liquid. The error in titration which is liable to arise from the addition of the talcum is probably so small that it can safely be neglected. Should very exact results be desired, this error can be entirely eliminated by standardizing the acid and alkali with the same alkaloid under the same conditions, *i. e.*, with the use

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[1] *Ber. d. Deutsch. Chem. Ges.*, 1899, 2872; *Pharm. Arch.*, Vol. II, No. 10.
[2] *Ibid.*

of an equal amount of talcum. In this way the final estimation of the isolated alkaloid presents no difficulty whatever.

The only other condition upon which the exactness of a drug assay depends is, then, the complete extraction of the alkaloids. In the case of fluids, the complete extraction of the alkaloids presents no difficulty. By the aid of immiscible solvents we can either directly, or after a few very simple operations, separate the alkaloids from the other plant constituents with such completeness that no known reagent will show the presence of alkaloid in the exhausted liquid.[1]

But the case is entirely different with solid, not wholly soluble substances, particularly crude drugs. The complete exhaustion of crude drugs is sometimes connected with such difficulties that very often fluid extracts contain much less alkaloid than is known to be contained in the drug which the extracts are supposed to represent. It is well known, for example, that fluid extract nux vomica, as sent out by most manufacturers, contains only about 1½ per cent. of total alkaloids, whereas the drug itself generally contains from 3 to 3¼ per cent. In the Pharmacopœial directions for making fluid extracts we are told to continue the percolation till the drug is exhausted. But how are we to know when the drug is exhausted? That the absence of appreciable quantities of alkaloid in a few drops of the percolate is not sufficient proof of complete exhaustion was shown in a previous paper,[2] in the case of colchicum. The only way to prove the completeness of exhaustion is to test the dregs qualitatively for alkaloids. This can be easily accomplished by removing the dregs from the percolator, drying them and then digesting a few hours with Prollius' fluid. After filtering and shaking out with acid water, the presence or absence of alkaloidal matter can be ascertained by means of the general alkaloidal reagents.

If this method of testing the completeness of exhaustion be applied to many of the methods which have been proposed for the extraction of alkaloids for assay purposes, it will be found that most of these methods are very far from securing complete exhaustion.

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[1] The great exactness of separation by immiscible solvents can be deduced from a formula given in Ostwald's "Analytische Chemie."

[2] Gordin and Prescott. Paper read at the meeting of the A.Ph.A., at Richmond, Va., 1900.

As we generally do not know how much alkaloid is left behind, it is impossible to introduce a proper correction in our results.

How ineffective some of the proposed methods of exhaustion are can be shown by applying the Dunstan and Short method [1] to the assay of nux vomica.

Ten grammes of dry powdered nux vomica were extracted in a Soxhlet with a mixture of alcohol and chloroform for three hours, as directed by these authors. The extract thus obtained, after passing through immiscible solvents, was assayed by the general alkalimetric method above referred to, using $\frac{N}{40}$ acid and alkali for titration and Mayer's reagent as precipitant. The dregs were then removed from the Soxhlet, dried and assayed separately by means of modified Prollius' fluid, as given later under nux vomica. The final estimation was again made by the above-mentioned alkalimetric method. In both cases, amounts representing 5 grammes of the extract and dregs respectively were taken up by 20 c.c. $\frac{N}{40}$ acid. The factor taken was the mean factor of strychnine and brucine.

EXTRACT.

$\frac{N}{40}$ acid consumed by 5 grammes, 13·5 c.c. = 2·46 per cent. total alkaloids.

DREGS.

$\frac{N}{40}$ acid consumed by 5 grammes, 2·7 c.c. = 0·49 per cent. total alkaloids.

By taking 1 gramme of talcum with definite amounts of $\frac{N}{40}$ acid, making up the liquid to 100 c.c., filtering off 50 c.c. and titrating with $\frac{N}{40}$ alkali, using phenolphtalein as indicator, I find that this amount of talcum consumes 2 c.c. $\frac{N}{40}$ acid. It is therefore best to use 1 gramme talcum in all cases where the precipitate refuses to separate out, and deduct 2 c.c. from the total amount of $\frac{N}{40}$ acid consumed by the alkaloid.

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[1] Prescott's "Organic Analysis," 1887, 456.

We see that by Dunstan and Short's method we only extract about 83 per cent. of the total alkaloids.

In order to select the best method of extraction among the great number proposed for that purpose, the custom has generally been to make comparative assays of one and the same drug by different methods and give that method the preference which gives the highest results. This way of establishing the correctness of a method is certainly not without faults. It is not the high results we want, but the true results. Just as some faulty features of a method are liable to give results below the truth, there are others which might give results above the truth. The explanation of a method giving too low results is easily found by admitting that either the extraction is not complete or the operations of the method involve a loss of some alkaloid. The cause of too high results is not so easily found, but a method should not be adopted unless it be shown that it gives exact results, or at least approaches the truth nearer than any other method.

Now, it is certainly possible to work out for every drug a method which will have this quality. Such a method might be too tedious, too expensive, and too complicated for general use. But such a method could be used as a standard with which simpler and quicker methods could be compared. If it can be shown that the standard method gives the most exact results obtainable at the present state of our knowledge and that among the many simpler methods a particular one gives results which approach those obtained by the standard method better than any other method, that particular method should be chosen for general use. Any other method giving either higher or lower results than the standard method should be rejected. How to find such a standard method I shall try to show in the case of a few drugs only, but the principles can be extended to any other drug.

The necessary and sufficient demands which should be put to a standard method are :

(1) That the exhaustion should be so complete that no alkaloid could be found in about 5 grammes of the dregs by the method explained above.

(2) The operations involved in the standard method should only be such as are not liable to injure the alkaloid under consideration. Heat, strong acids or strong alkali and prolonged exposure to the

air should therefore be avoided as much as possible. As it is impossible to exhaust some drugs like nux vomica, ipecac and cinchona without the use of acids, only very dilute acids should be used.

The standard method might vary from drug to drug, but in no case shall any method be adopted as a standard unless it possesses the above-mentioned features. As we have to admit that a method which gives good results upon one sample of a drug will give equally good results with any other sample of the same drug, provided the samples are in the same condition of fineness, etc., we can establish by means of the standard method the actual amount of alkaloid in a given drug as exactly as it is possible at present, and then try different expedient methods until we find one which, being simple and expedient, gives results which are the same or very nearly the same as those obtained by the standard method. Should there not be such a simple method, we can adopt any desirable method and introduce a definite correction into our results.

With these principles in mind, I started to apply the ideas here developed to a few of the more important medicinal drugs. Among the drugs chosen, some are very easily affected by strong reagents, but easily exhaustable (coca), others are quite stable in presence of reagents but are very difficult to exhaust (nux vomica), and again others are both easily affected and difficultly exhausted (ipecac). As my intention was not to compare most of the proposed methods with each other, but only to find one among them which gives results approaching sufficiently near those of the standard, I shall not record a large number of experiments with many methods which proved not to answer the above requirement, but shall give briefly the positive results and how they were obtained. In every case I first established a standard method and then tried to find a suitable substitute for this method. Should any other more expedient method be found, it might easily be adopted, providing its results are not far from those of the standard.

The most expedient seem to me to be the following two methods, which I shall call method A and method B. As one or the other of these two methods has given very good results as compared with the standard method in the case of the drugs tried, I have not considered any other method, but it is possible that in the case of other drugs some other method might give results even more concordant with those obtained with the standard method.

METHOD A.

Ten grammes of the drug in No. 60 powder are put into a Dunstan and Short apparatus,[1] and extracted with alcohol (95 per cent.) for about three to four hours on the asbestos plate. Most of the alcohol is then distilled off from a water-bath, and when the extract is reduced to about 10 c.c., it is cooled and diluted with water containing about 1–2 per cent. sulphuric acid. The liquid is then poured into a 50 c.c. or a 100 c.c. measuring flask, washing the vessel in which the boiling took place, and filling up the flask to the mark with acidulated water. The liquid is now shaken with a little talcum, filtered, and in 25 c.c. of the filtrate the alkaloids estimated by passing through immiscible solvents, using either ammonia or sodium hydrate for the liberation of alkaloids and either ether alone or a mixture of ether and chloroform in the right proportions to take up the alkaloids. In the case of hydrastis, a little potassium iodide is added before filling the flask up in order to remove berberine. The alkali used to liberate the alkaloid is in most cases ammonia, except in the case of cinchona, where it was found that ammonia gives rise to an emulsion, whereas sodium hydrate works very well. If a fixed alkali be used, it is necessary to shake up the ethereal solution of the alkaloid with calcined magnesia, and filter in order to remove the last traces of alkali.[2] After distilling off the ethereal liquid the alkaloids are estimated by the general alkalimetric method, referred to in the beginning of this article.

METHOD B.

This consists in digesting the drug in very fine powder with ten times its amount of Prollius' fluid modified,[3] putting the mixture into a mechanical shaker for four hours, or shaking frequently during twelve hours, drawing off an aliquot part, and shaking out with acid water. The alkaloids are then set free by ammonia, or Na-

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[1] *Pharm. J.* (3), XIII, 664; Allen, "Org. Anal." 3d ed., Vol. II, Part I, page 21. This apparatus is far superior for hot extraction to the ordinary Soxhlet. The temperature of the menstruum is higher and the working of the apparatus simpler and always continuous. It is only necessary to have the menstruum boil so quickly that the drug is always covered with liquid, and to put a piece of cotton and then a heavy piece of glass, or better, a piece of lead, on top of the drug.

[2] *Arch. d. Pharm.*, 1900, 336.

[3] Lyons' "Handbook," 1899, 23.

OH, and shaken out with an immiscible solvent. The final estimation is carried out in the same way as in method A. The method B is practically the same as that given by Lyons in his "Handbook," on page 43. It differs from Keller's method in so far that no water is added for the purpose of causing the drug to ball together, and that the liquids are taken by volume, not by weight. This addition of water is certainly a source of indefinite error. Water takes up some ether and together with it some alkaloid. Besides, water itself dissolves the alkaloids to a greater or less extent. Codeine, for example, is soluble in eighty parts water, atropine in 135 parts.

But even an alkaloid which is very difficultly soluble both in water and ether is taken up to a considerable extent by water when an ether-chloroform solution of the alkaloid is shaken with water. The following experiment proves this:

0·1027 gramme strychnine was dissolved in 10 c.c. chloroform; to this solution 30 c.c. ether and 10 c.c. water was added and the whole shaken a minute or two in a separator. After a half hour's standing the perfectly clear lower aqueous layer was drawn off into a tared aluminum evaporating dish, the liquid completely removed by evaporating on the water-bath, and after drying and cooling at 125° C., the vessel again weighed. It was found that 0·0044 gramme of strychnine, or about 3 per cent. of the amount taken, was taken up by the water.

As in the assay of drugs, we very often work upon quantities containing less than 0·1 gramme alkaloid, and the quantity taken up by the water depends only upon the amount of the latter, the loss from the solubility of the alkaloid in aqueous layer is liable to be even greater.

On the other hand, the water which, in Keller's method, is added to ball the drug together, taking up some ether, diminishes the volume of the latter, so that by drawing off half the amount of the ethereal liquid originally added, either by weight or by volume, we actually get more than half of the amount originally taken, and the results will be too high. The influence of this circumstance was also proved by experiment.

0·1047 gramme strychnine was dissolved in 50 c.c. of a mixture of three parts of ether and one part chloroform; 12·5 c.c. water was now added, the mixture shaken, and after complete separation into

two layers, 25 c.c. of the upper layer was removed into a tared aluminum dish. After complete evaporation, drying at 125° C. (to remove all trace of chloroform), and weighing, 0·0564 gramme of strychnine was found to have been contained in the 25 c.c. ether-chloroform. This is more than half the amount of strychnine taken by 0·0041 gramme, or nearly 8 per cent. in excess.

As can be seen from these experiments, the error in excess is far greater than the error causing a lowering of the results. It is for this reason that Keller's method (with the addition of water) generally gives higher results than when the water is left out. This was proved by the following experiment:

(1) Fifteen grammes belladonna root in No. 80 powder were digested with 150 grammes of a mixture of three parts ether and one part chloroform for ten minutes. Ten c.c. ammonia (10 per cent.) were then added and the mixture shaken four hours in a shaker. Thirty-five c.c. water were now added, and after shaking and settling of the drug, 100 grammes (= 10 grammes drug) were drawn off and shaken out with three portions of acid water, using 50 c.c., 40 c.c. and 30 c.c. successively. The alkaloid was then shaken out with light chloroform-ether mixture and ammonia, and estimated alkalimetrically by my general method, using Wagner's reagent as precipitant.

(2) The same amount of the same drug was treated in exactly the same manner, only leaving out the addition of water.

The results obtained were as follows:

	$\frac{N}{40}$ Acid Consumed by 10 Grammes.	Percentage of Alkaloid.
(1) With water	9 c.c.	0·648
(2) Without water	7·6 c.c.	0·576

The addition of water then raised the results nearly 11 per cent. It is for this reason that in method B the addition of water was left out altogether. The ethereal layer, in most cases in my experience, separates out quite well, even without the addition of water, provided it is set aside for a sufficient length of time. In some cases the shaking up of the mixture, before drawing off the aliquot part, with about 2 grammes of calcined magnesia, will clear up the supernatant layer very quickly.

COCA LEAVES.—STANDARD METHOD.

Ten grammes in No. 60 powder were moistened in a small mortar with 5 c.c. of diluted alcohol, then placed in a small percolator, washing the mortar out repeatedly with fresh menstruum and pouring the washings on the top of the drug. Following the general rules of percolation, *i. e.*, macerating forty-eight hours, etc., the percolation was continued very slowly till about 200 c.c. of percolate were obtained. The first 10 c.c. were received into a 50 c.c. measuring flask and set aside; the balance was concentrated in vacuo, first at about 45° C., then at ordinary temperature, till reduced to about 25 c c. This was added to the reserved portion, and the whole, after washing the vessel in which the concentration took place with acidulated (2 per cent.) water, was made up with acid water to 50 c.c.

The dregs were first deprived of moisture as much as possible by forcing dry air by means of the pump through the percolator, and then thoroughly dried in desiccator. After digesting 5 grammes of the dregs a few hours with Prollius' fluid, filtering, and shaking out with acidulated water, no alkaloid could be detected either by Mayer's or Wagner's reagents.

The exhaustion being complete and no strong reagents or high heat having been used, this method of extraction was taken as a standard. The alkaloidal assay of the leaves was now carried out by filtering the acid liquid (using a little talcum), shaking out 25 c.c. (= 5 grammes drug) four times with ether and ammonia, using 30 c.c. ether each time. After distilling off the ether completely, a few drops chloroform and then 20 c.c. of $\frac{N}{40}$ acid were added, and the chloroform removed by blowing air into the flask. The estimation was then carried out by my general alkalimetric method, using Mayer's reagent as precipitant.

It was found that 5 grammes of the drug consumed 6·6 c.c. $\frac{N}{40}$ acid = 1 per cent. ether soluble alkaloids, calculated as cocaine.

The same leaves in the same state of fineness were then assayed by method A. The liquid, after distilling off the alcohol, was made up to 50 c.c. with acidulated water, filtered through talcum, and in 25 c.c. of the filtrate the amount of alkaloid estimated exactly as in the standard method.

Two assays by method A gave the following results:

Method Used.	$\frac{N}{40}$ Acid Consumed by 5 Grammes.	Percentage of Alkaloids (Ether Soluble).
Standard	6·6	1·00
A	6·5	0·988
A (duplicate)	6·6	1·00

Method A giving the same results as obtained by the standard method, and being easily carried out, this method A should be adopted for the assay of coca leaves.

HYDRASTIS CANADENSIS.—THE STANDARD METHOD.

Ten grammes of hydrastis in No. 60 powder were treated exactly as the coca leaves were treated in the standard method for that drug, but using a menstruum consisting of six volumes of alcohol, three water and one glycerin (U.S.P. menstruum for fluid extract hydrastis). The dregs, examined as described under coca leaves, were found to be free from hydrastine. The percolate was concentrated in vacuo to about 50 c.c., mixed with the reserved portion previously received into a 100 c.c. measuring flask, and after washing the vessel in which the concentration took place, diluted to 100 c.c. with water containing 2 per cent. sulphuric acid and about 5 per cent. potassium iodide. After shaking a few minutes the liquid was filtered and 20 c.c. of the filtrate (= 2 grammes of drug), after making alkaline with ammonia, shaken out three times with a mixture of three parts of ether and one part of chloroform, using 30 c.c. each time. The assay was then finished as that of coca.

The same drug in the same state of fineness was then assayed by method A, finishing exactly as in the standard method just described, *i. e.*, using potassium iodide, making up to 100 c.c., etc.

Method Used.	$\frac{N}{40}$ Acid Consumed by 2 Grammes.	Percentage of Alkaloid (Hydrastine).
Standard	7 c.c.	3·47
A	7 c.c.	3·47
A (duplicate)	7 c.c.	3·47

Method A giving such good results as compared with the standard method, A should be adopted for the assay of hydrastis in preference to all other methods.

LABORATORY OF
THE WM. S. MERRELL CHEMICAL COMPANY,
Cincinnati, O.

(*To be continued.*)

GUM MASTIC.

By Henry C. C. Maisch, Ph.D.

About a month ago there was brought to the analytical department of Hance Brothers & White a sample of mastic which was so light in color that substitution was at once suspected. On submitting it to comparative test, with other samples of the ordinary commercial variety, it was found that the several specimens were identical.

I then looked up the literature on the subject of the color of mastic and came across historical data which may prove of interest.

The species of Pistacia lentiscus is indigenous to the basin of the Mediterranean, but it is only in the island of Scio (formerly Chios) where the resin is collected and then only from a broad-leaved variety cultivated in the northern portion of this island. Orphanides has shown in 1856 that there are probably other places in the Grecian archipelago and on the Grecian mainland suitable for its cultivation. The trade in mastic was the property of the Sultan until the separation of Greece from Turkey. Twenty-two thousand oka (1,260 grammes each) were claimed as tribute, and for the balance of the crop only a small price was paid. In 1822 the island was devastated and a large number of the inhabitants killed by the Turks, and as the above arrangement could not, in consequence, be continued, the islanders obtained the privilege of selling mastic to any one, but were compelled to pay an annual tribute of 750,000 piasters, or about $2,250. Under this arrangement the lot of the planters was somewhat more agreeable, as they obtained decidedly better prices for their crops.

During May and June vertical incisions are made into the bark of the trees from which the resin slowly exudes in the form of drops or tears. These gradually harden and are collected between August and November and assorted into three kinds. The best variety consists of white or at most pale yellowish tears darkening somewhat with age. Flückiger ("Pharmacognosie des Pflanzenreichs," 3d edition, p. 115) states: "Perfectly fresh they (the tears) are of a somewhat greenish tint due to the chlorophyl of the bark; this soon disappears and is replaced by entire freedom from color, or after a longer time by a dull yellowish tint. The poorer quality is yellowish from the start." In the Pharmacographia, 2d edition, p.

164, the authors state: "They are of a pale yellow or slightly greenish tint, darkening by age, dusty and slightly opaque on the surface." Martius ("Pharmacognosie," 1832, p. 364) distinguishes several varieties and classes the seraglio mastic as the best. It was shipped principally to Constantinople for use in the Sultan's harem, but at that time appearing occasionally in European commerce. He describes this variety as appearing in "separate, white or yellowish-white, roundish tears." The tears have a glassy appearance internally and possess a peculiar balsamic odor which becomes more pronounced on heating. Mastic is aromatic, and when chewed becomes plastic, by which it is distinguished from sandarac, which remains in the form of powder.

Mastic is chewed in the Orient for perfuming the breath and whitening the teeth and is said to have the property of hardening the gums.

Bombay mastic, which occasionally appears in the market, is an oleoresin obtained from Pistacia terebinthus, a variety of which yields the Chian turpentine. According to the Pharmacographia Indica, Vol. I, p. 378, "The general appearance is much the same as that of true mastic, but the color is rather deeper and it wants the fine perfume of the latter article. In the rainy season, unless kept with great care, it runs into a pasty mass."

The two kinds differ in solubility. According to Fielding (Pharmacographia Indica, Vol. I, p. 379), 75 per cent. of true mastic is soluble in hot alcohol, while the Bombay mastic dissolves completely; true mastic and Bombay mastic are completely taken up by hot turpentine, but on cooling the solution of the latter variety gives a precipitate appearing in cauliflower-like masses and amounting to 25 per cent. of the dissolved mastic. Wills ("Vegetable Materia Medica," 1886, p. 72) states that Bombay mastic is soluble in alcohol and this solution is colored brown by ferric chloride.

The chemical composition of mastic is about 1 per cent. of volatile oil, 80 to 90 per cent. of alpha resin and 10 to 20 per cent. of beta resin or masticin. The alpha resin only is soluble in cold alcohol, possesses an acid reaction and is known as mastichic acid. According to Tschirch, mastic belongs to the "resene resins" and consequently would contain no resin esters.

K. Dieterich (*Pharmaceutische Centralhalle*, 1899, 453) has determined the acid numbers of several samples of mastic; Bombay mastic, 137·6, 103·89; Levantine, 65·99; Turkish, 90·56.

The process proposed is to dissolve 1 gramme mastic in 50 c.c. benzine, add 10 c.c. decinormal alcoholic and 10 c.c. decinormal aqueous potassium hydrate solution and put aside for twenty-four hours in a closely stoppered bottle, occasionally shaking. At the end of this time the mixture is titrated with decinormal sulphuric acid, using phenolphtalein as indicator, but adding no water. The difference between 20 and the number of cubic centimetres of decinormal sulphuric acid used multiplied by 28 gives the acid number.

This method was used in the examination of the mastic samples above referred to.

No. 1 was a blank experiment made without the addition of any mastic and required 19·9 c.c. sulphuric acid for neutralization, and this number was used in place of 20 mentioned above.

No. 2 was the white sample referred to in the beginning and required 17·85 c.c. sulphuric acid; $19·9 - 17·85 = 2·05 \times 28 = 57·4$.

No. 3 was of a pale yellowish tint and required 17·4 c.c. sulphuric acid; $19·9 - 17·4 = 2·5 \times 28 = 70$.

No. 4 was like No. 3 in color, a pale yellow, and required 17·8 c.c. sulphuric acid; $19·9 - 17·8 = 2·1 \times 28 = 58·8$.

No. 5 was of a deep yellow color and required 17·8 c.c. sulphuric acid; $19·9 - 17·8 = 2·1 \times 28 = 58·8$.

These acid numbers are similar to that obtained by Dieterich for Levantine mastic, and the samples behaved with alcohol like true mastic.

THE PRODUCTION OF NITRIC ACID FROM ATMOSPHERIC NITROGEN.

By M. I. Wilbert.

It does not seem to be generally understood that the production of nitric acid and the various nitrates by the combustion of atmospheric nitrogen is one of the immediate possibilities of the future. Text-books on chemistry, when speaking of the chemical properties of nitrogen, usually content themselves by asserting that nitrogen is neither combustible nor is it a supporter of combustion. And while this is true in the ordinary sense of the word, or under ordinary conditions, nevertheless, it has been known for many years that nitrogen is combustible under favorable conditions, and the only reason why we are not enveloped in a sea of nitric acid, instead of a mixture of nitrogen and oxygen, is because the ignition point of nitrogen is higher than the temperature of its flame.

Many attempts at the artificial production of nitrogen compounds have been made, from time to time, and as a result of these experiments it was found that, when hydrogen is burned in oxygen having an admixture of a small quantity of nitrogen, a portion of the latter combines with some of the oxygen to produce one or more of the oxides of nitrogen. It was also found that when atmospheric air in a glass globe, or other confined space, is subjected to a series of electric sparks, red fumes of nitrogen tetroxide were formed. These fumes, in the presence of water, are decomposed with the formation of nitric acid. It was subsequently learned that when the air is compressed the production of red fumes is materially increased.

This combustion of atmospheric air by means of induced currents seems to indicate the solution of the problem, so that even at the present time it would seem possible that nitrogen compounds might be produced economically in this way.

Sir William Crookes, in the presidential address before the British Association for the Advancement of Science, held at Bristol, England, in 1898, referred to this particular problem at some length. He made especial reference to the necessity of the nitrates as fertilizers for the growth of cereals, for which, it is estimated, upward of 2,000,000 tons are used annually. In the course of this address, Sir William Crookes recounts the experiments of Lord Rayleigh, who had tried in various ways to effect the combustion of the nitrogen in atmospheric air for the purpose of separating argon.

From the data furnished by Lord Rayleigh's experiments, Sir William Crookes gives some interesting figures. He estimates that at the present price of coal, with a possible conversion of 10 per cent. of its available energy into electricity, sodium nitrate might be produced at about $130 per ton. If, on the other hand, the initial cost of the electric current could be cut down to one-fifth, as at Niagara Falls, it would reduce the cost of electric sodium nitrate to $26 per ton, and this latter figure, with native nitrate quoted at about $37.50 per ton, would seem to offer a fair margin of profit.

There is even a possibility of improving on these figures. Within a year or two, another source of energy has been suggested that seems destined to play an important part in mechanical and industrial development. This source of energy is derived from the conversion of blast furnace gases into power by means of a new style gas engine that has been introduced at some of the larger

blast furnaces in Europe, especially in Belgium and in Germany. This type of engine was shown at the late Paris Exhibition and seems to have attracted considerable attention. It is claimed by men who have made a study of blast furnace practices that it would be possible to generate a considerable excess of power at these plants as a result of the introduction of this type of engine.

The power generated from this source would necessarily be more or less irregular, so that it could be used to advantage only in the manufacture of some more or less unimportant by-product. It could, for instance, readily be converted into electric energy, and this in turn could be used in the production of various nitrogen compounds, the raw materials for which are always at hand and in unlimited quantities. This available source of energy, with a large and constantly increasing demand for nitrates as fertilizers, would seem to offer considerable inducement for the practical application of a process for the artificial production of nitrogen compounds.

OIL OF WALNUTS (JUGLANS NIGRA, L.).[1]

By Lyman F. Kebler.

Frequent and repeated efforts were made to secure a pure oil of walnuts, with the invariable result that the dealers were either unable to supply it, or oils like the following were sent:

No. 1. *Walnut Oil, White.*—This article was colorless, of a sweetish taste, with a peppermint-like flavor and soluble in water and 92 per cent. and 50 per cent. alcohol. Farther investigation showed it to be diluted glycerin, flavored with a menthol-like body.

No. 2. *Walnut Oil, Conc.*—The word concentrated immediately cast a halo of suspicion about this oil, and on submitting it to a fractional distillation about 80 per cent. came over between 78 and 85° C., which was chiefly ethyl alcohol. Then the thermometer rose rapidly to 205° C., which is the boiling point of nitrobenzene (oil of mirbane) and the odor confirmed the boiling point. A small amount of non-volatile matter was left.

When it is remembered that oil of walnuts is chiefly used by artists for paints, because it dries into a varnish which is less liable to crack than linseed oil varnish, the enormity of such adulterations becomes self-evident.

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[1] Read before the Chemical Section of the Franklin Institute and contributed by the author.

Having been unable to secure an oil of good quality, walnut kernels were secured, ground, and the oil expressed by means of a hydraulic press. In this way 25 per cent. of oil was obtained, while the kernels actually contained 66 per cent. of oil. It was thus deemed of interest to investigate the oil, inasmuch as no such examination seems to have been made.

The oil generally used is that obtained from *Juglans regia*, L., a tree indigenous to Persia and cultivated in Europe and America. The kernels of this nut contain from 30 per cent. to 40 per cent. of "virgin" oil. The fresh cold-drawn oil[1] is limpid, nearly colorless or pale greenish-yellow and of agreeable taste and odor, has a specific gravity of 0·925 to 0·9265 at 15° C., saponification number 186–197, iodine value 142 to 151·7, fusing point of fatty acids 16 to 20° C., dries well and is said to be brought into this country from France and Switzerland in 110-gallon tuns.

Hickory nut oil resembles the above walnut oil very much, and is known as "American Nut Oil."

Wm. T. Brannt (1896, "A Practical Treatise on Vegetable Fats and Oils," Vol. II, 37) says: "Oil of black walnuts is sometimes expressed, but is of little value." On examining the cold pressed black walnut oil, the following physical and chemical constants were obtained: it is limpid, of a straw yellow color, possesses a pleasant, agreeable, walnut-like odor and taste, becomes turbid at — 12° C., has a specific gravity of 0·9215 at 15° C., saponification number 190·1–191·5, acid number 8·6–9, ether number 181·5–182·5, Hehner's number 93·77, Reichart-Missel value 15 c.c., iodine value 141·4–142·7, melting point of fatty acids 0° C.

The drying qualities are excellent, equal, if not superior, in this respect, to linseed oil, leaving a tenacious, flexible, transparent film. An artist, on using it, pronounced it a very satisfactory article for fine painting.

THE WIDE OCCURRENCE OF INDICATORS IN NATURE.[2]

By G. S. Fraps.

In the course of some work on a black cow-pea bean, the writer's attention was attracted by the change from black to red which took place when it came in contact with an acid. Later, in speaking to

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[1] "Chemical Analysis of Oils, Fats, Waxes, etc.," by J. Lewkowitsch, 1898 p. 350.

[2] *Amer. Chem. Jour.*, 1900, p. 271.

Mr. G. H. Whiting, a student, about this, he mentioned that the juice of the blackberry had the properties of an indicator. These observations led to the work about to be described. Since completing it, the writer has been informed that a lady placed some violets in ammonia water to preserve them, and to her astonishment they became green.

The results of this work show that indicators are of very common occurrence in nature. Some seventy-four kinds of colored flowers, both wild and cultivated, the leaves of five varieties of coleus, the cow-pea bean, the blackberry, mulberry, smilaxberry, strawberry and the red beet were extracted with water or dilute alcohol, and the extract tested for indicators. In only three cases did the extract not become one color when acid and another color when alkaline. As a rule, the coloring matter was fairly sensitive as an indicator, being changed by from less than one to two drops of tenth-normal ammonia. Some of the changes were very sharp, and many of the colors were very beautiful. In some cases the color passed through several stages in going from acid to alkaline, or the reverse.

The materials examined could be grouped in four classes:

Class I.—Extract not affected by acid or alkali.

Class II.—Extract colorless when acid, yellow when alkaline.

The flowers in this class were yellow, and the yellow coloring matter was hardly affected by the extracting agent.

Class III.—Extract red (or a shade of red) when acid, yellow when alkaline.

Class IV.—Extract red when acid, green when alkaline.

Classes III and IV are not sharply separated, sometimes the color produced by the alkali being such that it was hard to decide whether it was yellow-green or green-yellow. Ammonia was the alkali used; often a green solution with ammonia would have been yellow with caustic soda. Most of the coloring matters in these two classes were very sensitive. In many cases the flowers were bleached when boiled with water, and the extract nearly colorless, or quite so; but it would become colored when made acid or alkaline.

Class V.—Miscellaneous. This includes all that do not fall in the other four classes. It must be observed that in no case do the colors occur in the reverse order from those in the other classes—that is, never colorless when alkaline and yellow acid, or red when alkaline and green or yellow acid.

The colors of the coleus, especially, depend on the degree of acidity of the leaf as well as on the kinds and distribution of the colors. With coleus colors there is a regular change in color from acid to alkaline, or the reverse, passing through several stages. It is easy to see that a slight change in the acidity of the sap of the leaf will affect the color and give rise to some of the manifold variations that are observed in the coleus. The same may be said of some flowers.

METHODS OF EXAMINATION.

Two methods were adopted for testing the color. In the one, small portions of the material were placed into two test-tubes with alcohol, a few drops of fifth-normal hydrochloric acid added to one, of tenth-normal caustic soda to the other, and the changes noted. It usually requires some time for the effect to be visible. In the second method the material was boiled in a large test-tube with about 20 c.c. of water, to which a little alcohol was often added, cooled, the extract poured off, and titrated with fifth-normal acid and tenth-normal ammonia. The two methods usually gave the same results, though they were sometimes different, as was to be expected, as in the one case all of the color, soluble and insoluble, was subjected to the action of caustic soda; in the other case only the soluble part was treated with ammonia. Method 2 allowed some conclusion as to the sensitiveness of the color to be made.

Class I.—Color unaffected by acid or alkali. This includes the orange flowers of *Stylosanthus biflora*, the yellow ones of *Chrysogonum Virginianum*, and the leaves of a smooth, red variety of coleus. Three materials not containing indicators were found out of eighty-one examined.

Class II.—The flowers in this class give a colorless extract which becomes yellow when made alkaline.

The color is moderately sensitive. All of the flowers but one—the white petals of the wild daisy—are yellow or orange. Yellow is a color which cannot be extracted by boiling water. In some cases it goes into solution with the tenth-normal caustic soda.

This class comprises 10; stamens of begonia and *Solanum Carolinense;* petals of canna, *Œnothera sinuata*, *Hypoxis erecta*, buttercups, allamanda, wild daisy, a yellow wild flower, and leaves of the yellow coleus.

Class III.—In this class the materials give extracts which are red or a shade of red when acid, yellow or a shade of yellow when alkaline. All the colors are fairly sensitive, being changed by at least two drops of tenth-normal ammonia. Twenty-one of the 81 materials examined fall into this group, 11 being originally red or pink flowers, 4 orange or yellow, 5 purple or violet, 1 green (coleus leaf). The red and pink flowers were the pink, rose (faint pink, rose and wild rose), pink larkspur, crimson clover, phlox (faint pink, light claret, rose, scarlet, magenta), begonia (2 varieties), double oleander, a variety of *Euphorbia*, *Spensonia goligefolia rosa*, *Clerodendrum* and *Silene Virginica*. With the exception of *Clerodendrum*, which gave a well-colored, orange-pink solution, all of the flowers above named were bleached when boiled with water, giving a colorless or faintly colored solution, which, however, became colored on the addition of acid or ammonia. Verbena flowers gave extracts yellow with caustic soda, but green with ammonia, and the extract from sweet peas, green when first made alkaline, became yellow on standing. These two are included in Class IV.

The purple or violet flowers were the vetch, Mexican sage, heliotrope, *Clematis ochroleuca* and *Solanum Carolinensis*. They were bleached by the boiling. The orange or yellow flowers were orange nasturtium and canna, *Asclepias tuberosa*, yellow *Allamanda vereofolia*. The yellow color of the flower was unaffected, but a colorless or faintly colored extract was formed which became colored on addition of acid or ammonia. A red-orange extract was obtained from the green part of the leaf of a red and green coleus, which was red with acid and brown-yellow with ammonia.

Class IV.—This includes those coloring matters which are a shade of red when acid, a shade of green when alkaline. The greens are at times of a beautiful emerald color, sometimes of a yellowish tinge. Most of the colors are very sensitive to the reagents, being affected by less than one drop of tenth-normal ammonia.

Thirty of the materials examined fall into this class, 15 being originally a shade of red, 9 violet or purple, 3 blue, 1 lilac, 1 black (bean), 1 yellow. The flowers a shade of red were: red clover, scarlet sage, Canterbury bell, red zinnia, rose geranium, crimson honeysuckle, California poppy, verbenas (faint pink and rose), sweet peas (faint pink, rose, maroon, magenta, lavender), gladiolus (rose),

red cyclamen, varieties of *Bumaldæ*, hibiscus, *Tephrosia* (devil's shoestring), and leaves from four varieties of coleus. With the exception of hibiscus, scàrlet sage and coleus, the extracts from these were colorless or nearly so.

The purple or violet flowers were phlox, petunia, coriopsis, verbena, sweet peas, "Jimson weed," maypop, or passion flower, *Specularia perfoliata* and *Ruellia ciliosa.*

The lilac flower was *Salvia urtica*, the blue ones were *Ageratum, Runella vulgaris* and blue larkspur, the yellow one was nasturtium, and the black material, a cow-pea bean.

The colors from some of these flowers passed through several stages on the way from acidity to alkalinity. The most noteworthy are:

Specularia perfoliata: Magenta, blue, green.

Ruellia ciliata: Rose, lilac, green.

Salvia urtica: Claret, peacock-blue, green.

"Jimson weed:" Magenta, purple, green.

Maypop or passion flower: Magenta, blue, green-blue, olive-green.

Blue larkspur: Magenta, purple, blue, peacock-blue, green.

Purple petunia: Magenta, purple, blue, green.

California poppy: Magenta, purple, violet, peacock-blue, green.

Red coleus: Red, claret, violet, green.

Red and yellow coleus: Rose, brown-red, orange-red, yellow-green, olive-green.

Light red, dark red and green coleus: Cherry, violet, brown, green-brown, dirty green.

Red and deep red coleus: Magenta, purple, blue, green.

Most of the colors above given were very bright and beautiful, and, as a rule, fairly sensitive.

The coloring matters of the following flowers in this group are especially sensitive: "Jimson weed," maypop, *Salvia urtica*, black cow-pea (bean), *Ruellia ciliata.*

Class V.—This group includes substances giving colors with acid and alkali that do not come into the classes already described.

The colors are those produced by ammonia. The color, when acid, is given first, then the stages it passes through to alkaline.

Bougainvillea spectabilis (mauve): Purple, colorless.

Gloxinia hybrida (pink): Pink, purple, brownish-red.

Gloxinia hybrida (purple): Magenta, purple, olive-green.

Dendrobium nobitia (purple): Pink, purple, blue, green.
Amaryllis (red): Cherry, maroon.
Salvia (red): Orange, dark red.
Cynthia (yellow): Yellow, terra-cotta.
Geranium (scarlet): Scarlet, violet.
Gaillardium (red): Scarlet, corn, yellow-brown.
Snapdragon (red): Red, red-brown.
Canna (red): Red, orange-brown.

Fruit:
Smilaxberries (red): Pink, violet.
Beets (red): Magenta, purple.
Strawberries: Straw, purple.
Blackberries: Rose, colorless.
Mulberries: Cherry, violet.
Brown cow-pea bean: Colorless, brown.

LABORATORY OF THE NORTH CAROLINA COLLEGE OF A. AND M. ARTS, June, 1900.

CORRESPONDENCE.

PROCTER MEMORIAL.[1]

In response to a letter from the Editor of this JOURNAL concerning the most appropriate way of memorializing the life and work of Professor William Procter, Jr., the following are some of the replies which have been received:

DEAR SIR:—Your letter of the 7th inst., requesting an expression of opinion as to the form of memorial to the late Professor Procter I would most favor, has been duly received. It affords me particular pleasure to comply with this request, inasmuch as it brings to mind personal memories of the one whose life and work it is proposed to commemorate, and for the purpose in view I believe that no more fitting opportunity could be found than on the occasion of the fiftieth anniversary of the American Pharmaceutical Association—a body which is not only the national exponent of American pharmacy, but one with which he was so long and so intimately associated.

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[1] For other information and correspondence on this subject, see editorials November, 1900, and February, 1901, and correspondence February and March issues of this JOURNAL.

I am reminded that it is twenty-seven years ago this month since Professor Procter passed away, and as a member of the class before which he delivered his last course of lectures, it may be of interest to mention that as I write from this distant city I have before me, carefully preserved, my student notes of the lecture on pharmacy which he delivered on the eve of his death, dated February 9, 1874. The subject of that lecture was "Animal Substances," and it included the consideration of gelatin, milk, the preparation of lactic acid and lactates, albumen, cod liver oil and pepsin. As Secretary of the Class Society I was also commissioned to convey to the family of Professor Procter the resolutions of sympathy which my fellow-students had adopted on the occasion of his death. The recalling of these incidents after such a considerable lapse of time may serve to explain the special interest which I feel, and which I know to be shared by one of my classmates, Henry S. Wellcome, for many years resident in London, in the success of the project under consideration.

With regard to the form of memorial, it may be well to consider in the first place what Professor Procter would himself have wished, and secondly, what is feasible to accomplish. The work of Professor Procter was, to a large extent, that of a pioneer, and, in my opinion, his memory and the influence he exerted as a teacher and investigator could not be more fittingly and more usefully perpetuated than by the foundation of a scholarship to be known by his name. If a fund sufficiently large for this purpose could be realized, which, unfortunately, is somewhat doubtful, it should be held in trust by the American Pharmaceutical Association, and the interest applied for the higher scientific education at one of the leading American or foreign universities, during a period of at least two years, of such a graduate student of pharmacy as might be found, by a competitive examination conducted by a committee of the Association, properly qualified and otherwise worthy of receiving the specified grant. The value of such a benefaction would naturally not remain confined to the individual recipient of it, but might reasonably be expected to exert the same ever-widening influence on scientific progress as the life and work of the one it serves to commemorate. The details of the conditions by which it would seem desirable that such a scheme should be governed for the attainment of the best results need not be further considered now.

If the plan for a scholarship on sufficiently broad lines is beyond the limits of practicability, I should favor in the second place the suggestion that has already been made by Dr. Fred. Hoffmann in a communication to this JOURNAL (February, 1901, p. 86), namely, the institution of a Procter-Squibb memorial medal, for the reason and the purpose therein stated.

My apologies should, finally, be tendered for having trespassed so largely upon your space. FREDERICK B. POWER.

LONDON, February 25, 1901.

DEAR SIR:—Yours to hand requesting my opinion with regard to the most suitable form of memorial of Professor Procter. I had already read those expressed in your February issue, and think that the most suitable form would be either a scholarship or research laboratory.

A statue will cost at least $15,000, and a further sum would be required to maintain it and its surroundings in good condition. The interest on this sum would be sufficient for a scholarship. My plan would be a travelling scholarship, tenable for, say, two years, open for competition to all graduates of colleges of pharmacy, the award to be made biennially by a committee of the A.Ph.A.

The interest on $15,000 would keep a student at one of the European universities. The scholarship would be a permanent institution perpetuating the name and inciting others to follow in the footsteps of Professor Procter, and the amount of good of which it will be productive is incalculable. Judging from what I have heard and read of Procter's character, the scholarship would be such as he himself would have chosen.

The suggestion of a research laboratory is a good one, perhaps the best yet made, but the question of funds for building and maintenance would have to be solved first. J. E. MORRISON.

DEAR SIR:—It is gratifying to know that a movement for memorializing the life and work of Prof. William Procter, Jr., is likely to take definite shape on such a fitting occasion as the fiftieth anniversary of the American Pharmaceutical Association.

While a number of plans worthy of careful consideration have been suggested, I feel decidedly in favor of establishing a Procter medal, to be awarded for original and worthy pharmaceutical work. I believe that such a memorial will keep alive the true spirit with which Professor Procter worked. H. M. WHELPLEY.

Dear Sir:—Replying to your recent favor concerning the memorial to Professor Procter, personally I think the best memorial that can be established for any man is a scholarship in the line of study that absorbed his attention. In this instance it might be a two year course of study in a desirable European institution.

E. L. Patch.

Dear Sir:—A true memorial serves a double purpose. It honors the man to whom it is dedicated and encourages others to emulate his example and continue his work. The first purpose is best reached by the erection of a monument in a place where the greatest number of his admirers or disciples can see it; the second, however, by some incentive in the shape of a reward for diligence, perseverance or accomplished work. Applying these premises to our case, I would, first of all, erect a monument to William Procter, either a life-size statue or a simple bronze bust, according to the available funds. If the former, it should be put in a public place of Philadelphia; if the latter, in the Philadelphia College of Pharmacy. Contributions for this monument should be solicited from all pharmacists in the United States, so that it would become a truly pharmaceutical tribute to one of our greatest masters.

The second part of the memorial should be undertaken by the American Pharmaceutical Association, of which Procter was a member, and which is the best representative society of American pharmacy. It should consist in a prize for acknowledged prominence in any of the branches of pharmacy, whether as teacher, inventor, manufacturer or practical pharmacist. A medal to be given at stated intervals to the deserving one seems to be the best form of reward, similar to the Hanbury medal of the British Pharmaceutical Conference.

Such a Procter medal, given to the best men of our profession, would be the highest testimonial that American pharmacists could receive and serve to perpetuate the work of the man whose name it bears.

William C. Alpers.

Dear Sir:—In forms of memorials, as in everything else, I consider that best which contributes most to the advancement and happiness of humanity and least to mere human vanity. Statues and the like will appeal most to those who think least deeply on the

subject. Scholarships, endowments for research and other such measures as will bring forth a constant fruitage of benefit to the race will be the ideals of the far-seeing; but sentimentalists will, perhaps, deem such forms too utilitarian to suit their tastes. If Professor Procter could himself be consulted upon what he would want, I have no doubt but that he would prefer the latter form, without hesitation. The constant suggestiveness of a continuously acting benefit never palls on consciousness but retains for centuries its sweet memories. A cold stone statue enthuses only when fresh and new, after which it is passed heedlessly by like the dead, lifeless thing which it is. Let the American Pharmaceutical Association deliberate upon and decide what kind of memorial will most, and for the longest time, shower benefit upon American pharmacy, and they will soon decide upon an ideal that will satisfy futurity.

R. G. ECCLES.

DEAR SIR:—In reply to your letter requesting my opinion on the subject of a suitable memorial perpetuating the life and work of Prof. Wm. Procter, permit me to suggest a memorial tablet of bronze, with a reproduction of the bust of Professor Procter and suitable inscription reminding present and future generations of the worth of the man.

No more fitting place for this memorial can be found than in the halls of the institution wherein his achievements were accomplished and of which his work is a corner-stone.

While this form of memorial appears to me most desirable, any suggestion finally adopted by those interested will meet with my most hearty approval.

F. G. RYAN.

DEAR SIR:—Answering your letter of recent date I would say: Regarding an appropriate celebration of the fiftieth anniversary of the A.Ph.A., and, in that connection, a Procter memorial, I do not believe, from what I knew of William Procter, personally, that a memorial of brass and marble would be in keeping with his practical life and views, however gratifying such a testimonial would be to his many revering friends. I would suggest that a committee be appointed, of which A. E. Ebert and Jos. P. Remington be its chief officers, consisting of a large number selected from the older and the younger pharmacists, to suggest to the Association an appropriate memorial. I, for one, should gladly help to carry out

their recommendations. I have read with much interest what has been said so well by the AMERICAN JOURNAL OF PHARMACY, editorially, and by the correspondents to that journal upon this subject, and am glad that it is being considered.

The revision of the Pharmacopœia has emphasized the fact that we are sadly in need of advanced workmen in pharmaceutical science—men of the Procter type—in different sections of our country. It seems to me that the A.Ph.A. could aid very materially in a practical way if it would take steps toward creating a scholarship substantially as proposed by E. L. Patch.

I referred to this at some length at a meeting of the Association in '95 (see Proc., p. 425–429, '95). After the reading of the paper, Professor Oldberg made a motion that a special committee be appointed to consider the recommendations then made and to report at the next annual meeting on the feasibility of carrying out the recommendations in this paper. That nothing has been done by the Association seems to show, perhaps, that the time is not quite ripe to take up the matter actively. Now that we may soon consider earnestly the question of a Procter memorial, I would again revive this motion, and place it before the committee I suggest. In suggesting a scholarship or fellowship, I am not losing sight of the main point—an appropriate memorial to one in whose memory a lasting monument would be a worthy token—but I am keeping before me the characteristics of him we are striving to respect. He was essentially a practical pharmacist. I do not think he himself would consider long as between an investment in marble or bronze and an endowment of a fellowship as an appropriate expression of a distinguished life such as we may seek to commemorate. In my opinion a monument would be insufficient to memorialize the man and inadequate to carry out what should be the aims of our worthy Association. If I can do anything to further the project under consideration I shall be very glad. L. E. SAYRE.

DEAR SIR:—Accepting the invitation, kindly given by yourself, to take part in the discussion, inaugurated by the AMERICAN JOURNAL OF PHARMACY, relative to "memorializing the life and work of Prof. William Procter, Jr.," one must, at the very outset, ask a series of questions that his right to participate may be assured and his efforts be properly directed.

Entirely pertinent seem the following: Do the pharmacists of the nation wish to preserve, throughout time, the memory of the "Father of advanced, of professional Pharmacy," in a manner that will not only do honor to the subject, but will evidence to the people of this country, even of the world, that there is a real science and profession of Pharmacy and that *Procter* was a most creditable and exemplary exponent of both? Do the friends, followers and, especially, former students of the good man and distinguished teacher wish to possess something entirely of him, his life's history and his writings?

Do the local members of his profession and the citizens of his adopted city and home, where the most of his useful life was lived and where he attained his greatest successes, desire to emphasize the power and influence of such a character and proudly claim him as their own? Or, would the commonwealth and the city, that honor him as their son, and the votaries of pharmacy therein residing, pay tribute to his memory and justly make to him such monument as will show their pride in the sonship and brotherhood which as greatly honors them all?

Two of these questions are purely local and must be answered by the councils of local associations and the representatives of the several bodies interested; another is to a privileged number, to those who were more fortunate than the many who knew him not, but who would, for all, do him honor—thus leaving one, alone, for general consideration. While all four propositions might very properly be answered in the affirmative and be profitably executed, there is no possible doubt but that the first not only should, but must have prompt and fit realization.

At the nation's capital, in artistic bronze, let the form of the nation's son and pharmacy's patron stand throughout the years as a memorial to his worth and a stimulus to his followers.

Very sincerely, HY. P. HYNSON.

BALTIMORE, February 18, 1901.

DEAR SIR:—Having carefully read the memorial paper of Professor Remington, your editorial of November, 1900, and the several suggestions, in the February issue of 1901, regarding the proposed actions of the A.Ph.A. in 1902, and also considered the possibilities and probabilities of success in securing the most useful and abiding

service to pharmacy and properly commemorating the life and work of Prof. William Procter, Jr., I reply to your request of the 5th inst. for my personal opinion.

Among the earliest and most helpful influences to me of the A.Ph.A. was the ever earnest, active work, though always modest, and the genial, lovable character of Professor Procter. I can never forget him, and often recall his approaching me with a list of "queries," with the request that I write in response to one or more. At that time I should have undertaken the task of writing a sermon or lecture upon the creation of the heavens and the earth as to prepare a paper for the Association.

Of all the men I have known in the Association, Professor Procter has and does seem to me to fairly represent what may be termed the "Good Shepherd" of pharmacy.

As I sit in church and see the memorial window to our late rector, representing in the central figure the good shepherd with a lamb in his arms, and in the side panels the four acts of mercy, I have thought how appropriate and serviceable such a memorial would be of Professor Procter, placed in the several colleges of pharmacy, a constant reminder of the "Father of Pharmacy." A life-size representation of Professor Procter, with his hand resting upon a young man, the Pharmacopœia and AMERICAN JOURNAL OF PHARMACY, four or more side panels representing such scenes as could be easily made up from Professor Remington's paper, would surely be an impressive, instructive, helpful and stimulating influence upon every student.

Some such work as this, it seems to me, your College should do at once. Thus, at the meeting in your city in 1902, the A.Ph.A. could properly request the several colleges to follow your example, and for their part, the A.Ph.A. to authorize the preparing of a beautiful Procter memorial certificate, twenty, thirty, fifty or more to be distributed annually to those worthy, recommended by those colleges who had put in the window or done something of the kind, and approved by a special committee or the Council of the A.Ph.A. and indorsed by the Association.

The certificate should be a fine engraving, possibly of your window, accompanied or not by a gold, silver, aluminum or bronze medal. And what a prize it would be!

It seems to me some such plan as this would be a suitable mem-

orial, and accomplish the most good to the greatest number. Such a commemoration of the life and work of one of our early members who has done so much in the Association, and made his life memorable as a leader and teacher in progressive pharmacy, and whose character is a model to follow, would be alike creditable to the memory of Professor Procter and the purpose of the A.Ph.A.

The cost or expense to the several colleges would not be large, and the annual expense to the A.Ph.A. after its first outlay could be easily provided for. It would certainly be national and not sectional, and, as I see it, of constantly increasing service in making exceptional pharmacists. H. M. WHITNEY.

RECENT LITERATURE RELATING TO PHARMACY.

EXAMINATION OF PETROLATUM.

The several characteristics which should be studied in the examination of soft petrolatum are as follows: Color, melting point, behavior under oxidizing agents, stability under heat of 200°, reaction, homogeneity and viscosity. As the melting point estimation is somewhat difficult, by reason of the gradual softening under heat, the best method is to melt the product in a beaker glass, stir with a thermometer until the liquid becomes cloudy and shows first suggestion of thickening, when the thermometer is read. As to oxidation, 3 grammes of the product warmed on water-bath with 10 c.c. acid permanganate solution ($\frac{1}{1000}$) should not decolorize the permanganate, even after ten minutes' heating. If the permanganate is decolorized, rosin oil is to be suspected. The heating to 200° is to detect presence of volatile hydrocarbons which are sometimes irritating; 10 grammes of the product heated five hours in an air-bath should lose not more than 8 per cent. in weight. The reaction of the petrolatum is tested by shaking an ethereal solution with 100 c.c. of water containing a few drops of any acid indicator. The writer prefers iodeosin. The homogeneity of the product is easily proven by examination under the microscope, when no paraffine needles should be noticed. The viscosity estimation is made with special apparatus; suffice it to say that an artificial petrolatum is much less viscous than the natural product. The article closes with a report on the examination of six commercial varieties of petrolatum.—(Dr. M. Hoehnel, *Ph. Zt.*, 1901, 28.) H. V. ARNY.

CINCHONA CULTURE IN INDIA AND JAVA.

Professor Verne, who was sent by the French Minister of Instruction to investigate the cinchona culture, mentions the following interesting facts in his report: The Indian plantations are found about 27° north latitude, 3,600 feet high, in a territory having temperature ranging between 28° and 85° F. The mechanical labor is performed by the natives, who receive from $1 to $1.70 per month, without food, according to age and sex. The favorite species of cinchona is the C. ledgeriana. The plants are raised on mossy ground, sheltered from the winds on one side by a hill and on the other side by thickets of bamboo, the young shoots being particularly susceptible to sudden changes of temperature. By the third year after planting, the tree is sufficiently grown to permit the removal of bark, which grows on again within three years without recourse to mossing operation. The same system is in vogue in Java, where, however, the variety of cinchona is not the English C. ledgeriana (Howard's), but the C. ledgeriana of Moen, the latter being found to yield 9 per cent. of quinine; or, if only the trunk bark about a metre above the ground is chosen, it yields 14 per cent. of quinine. On the other hand, the English C. ledgeriana assays on an average 4 per cent. In Java the cultivation of the latter variety is abandoned; while C. succirubra planting is diminishing. In both the English and Javanese plantations a very large source of profit is the manufacture of quinine on the spot from small and defective pieces of bark, unfit for shipment. Particularly striking is the method of quinine extraction as practiced in Java, it simply consisting of treating the powdered bark with a 5 per cent. solution of caustic soda, heated to 50° C., throwing this mechanically agitated mass into a reservoir containing Java petroleum of specific gravity ·999, removing the petrolic solution of alkaloids by mechanical devices into a warm reservoir, into which is poured water acidulated with sulphuric acid. This watery layer is removed, evaporated and from the concentrated solution the quinine sulphate separates by crystallization, which it is not necessary to recrystallize, since it contains only one-half of 1 per cent. of cinchonine. Of such quinine 50,000 kilogrammes are exported annually to the United States. The special reason of the success of this quinine manufacture is due to the exceedingly clever mechanical devices used in the extraction.—(*J. de Ph. et Ch.*, 1901, page 5.)

H. V. A.

VOLUMETRIC ASSAY OF SALICYLIC ACID.

The following method is suggested as an improvement over processes yet devised. Instead of using bromine acidulated with hydrochloric acid, potassium bromide is employed. This is treated with an exact quantity of sodium hypochlorite solution, titrated to represent in each litre 3·55 grammes of chlorine, 8 grammes of bromine, and 3·45 grammes salicylic acid. This volumetric solution will keep its strength for about a month if kept in a dark place. The details of the assay are as follows: 1 gramme salicylic acid is dissolved in 2 c.c. solution of soda and 50 c.c. water, and the volume brought up to exactly 500 c.c. by addition of distilled water. Twenty-five c.c. of this solution is put into an Erlenmeyer flask of about 375 c.c. capacity. Five c.c. of a 10 per cent. solution of potassium bromide and 10 to 15 drops of hydrochloric acid are added, and to this mixture is poured in drop by drop from a burette the titrated solution of hypochlorite, until one drop communicates a distinct but feeble yellow color to the mixture. To avoid error it is better to have a layer of 5 c.c. chloroform (with sufficient alcohol to prevent emulsification in the mixture) to receive the first suggestion of free bromine. When this yellow is reached, the amount of cubic centimetres of hypochlorite employed is read, and the exact amount of salicylic acid is estimated by multiplying by 3·45. The same method can be utilized for estimation of the salicylic acid, and also for phenol.—(F. Telle, *J. Ph. et Ch.*, 1901, 49.)

H. V. A.

OXIDIZING ACTION OF AMMONIUM PERSULPHATE.

This chemical converts uric acid in the cold to guanine, ammonium allanturate, ammonium oxalate and urea. It changes bilirubine in alkaline solution to biliverdine. It oxidizes hæmatine in ammoniacal solution in the cold, and more rapidly after heating, to a colorless liquid in which is found a precipitate of peroxide of iron. In the same way it attacks diluted blood. These reactions seem to point to the future value of this reagent in physiological examinations.—(L. Hugonenq, *J. de Ph. et Ch.*, 1901, 64.) H. V. A.

DETECTION OF OIL OF SESAME IN OTHER OILS.

A solution of 100 parts of hydrochloric acid to three or four parts of crystallized glucose is prepared. One part of the reagent is put

into a test-tube with two parts of the suspected oil. The mixture is shaken vigorously two or three minutes, heated to boiling, agitated in cork tube and then let stand. If the slightest trace of oil of sesame be present, the liquid assumes a beautiful rose color, passing rapidly to cherry red. The delicacy of the reaction is shown by the fact that the presence of 1 per cent. of oil of sesame brings the coloration within a few minutes, while 10 per cent. caused instant change.—(Tambon, *J. Ph. et Ch.*, 1901, 57.)

H. V. A.

SEPARATION OF PLATINUM METALS.

The platinum ores are roasted, reduced with hydrogen, washed with water, then with dilute hydrochloric acid. This removes alkaline salts and also iron and zinc. The metallic residue treated with twice its weight of sodium chloride, the mixture warmed in a current of dry chlorine at red heat. The volatile products of this reaction being condensed by appropriate apparatus, while the residue, which has been converted into soluble chlorides of the platinum group, is dissolved in water, thus freeing them from the chlorides of silver and lead respectively. To the solution of platinum metals, sodium carbonate and sodium nitrate are added, precipitating all remaining traces of metals foreign to the platinum group, leaving a solution of the double nitrites of sodium and ruthenium, platinum, palladium, iridium and rhodium respectively, while the osmium goes into solution as a sodium chloro-osmite. This solution is treated with caustic soda, then with a current of chlorine and distilled, when the osmium and ruthenium pass over as volatile peroxides (OsO_4 and RuO_4) which are separated by usual methods. The residue in the retort is treated with hydrochloric acid and boiled; sodium nitrite is added and then ammonium chloride, when the iridium and rhodium are precipitated as double nitrites with ammonium, which are insoluble in the presence of sal-ammoniac. The separation of the iridium from the rhodium is accomplished through the differing solubilities of the chloro-sodium compounds. The original liquid now contains platinum and palladium, and the former is separated from the latter by the formation of a chloroplatinate of ammonium, which crystallizes, leaving palladium in the mother liquor, which is removed by precipitation with cyanide of mercury.—(Leidie, *J. Ph. et Ch.*, 1901, 18.)

H. V. A.

VOLUMETRIC METHODS OF THE NEW GERMAN PHARMACOPŒIA.

Of the three methods of volumetric analysis, acidimetry or alkalimetry is employed in the new German standard for the estimation of not only the usual inorganic chemicals, but also in the estimation of such alkaloidal drugs as pomegranate bark, ipecac, aconite, nux vomica and its preparations, belladonna, cinchona, hyoscyamus and their preparations; also for balsam of Peru, balsam of Tolu, copaiba, rosin, wax, cod liver oil and oil of lavender.

The oxidation analysis includes the well-known chemicals such as iron salts, chlorine water and iodine, and through the latter it is applied to the iodine absorption estimation of fats. The precipitation volumetric analysis is directed for the same chemicals as in the U.S.P. and also for the assay of bitter almond water and the mustard oils. Concerning the estimations of the first class, that for the alkaloids is practically the same as in the U.S.P., a possible exception being that "jodeosin" is recommended as an indicator; always, however, with the addition of an ethereal layer. For the cinchona alkaloids, hæmatoxylin is preferred.

The estimation of acid number, ester number, and saponification number of oils and balsams is performed by treating the substance with semi-normal alcoholic potassa titration of excess with semi-normal hydrochloric acid, phenolphtalein being used as indicator. The approximate details of such estimation can be found in literature, notably Proceedings of the American Pharmaceutical Association, so suffice it here to state the following standards are chosen by the German authority:

	Acid Number.	Ester Number.	Saponification Number.
Balsam Peru	—	132·5	224·6
Balsam Tolu	112·3–168·5	22·4–78·4	—
Copaiba	75·6–179·7	—	—
Wax	18·5– 24·1	72·8–75·6	—
Oil lavender	—	84	—
Cod liver oil	—	—	196·6

The iodine absorption of fats is estimated by addition of the fat to an 87 per cent. alcohol containing mercuric chloride and a definite quantity of iodine; the mixture is allowed to stand forty-eight hours and the unabsorbed iodine is estimated by titration with decinormal sodium thiosulphate. Chloroform is added to the mixture for purpose of clearing, this aiding in obtaining accurate

results. One c.c. thiosulphate solution will equal 0·012685 gramme of iodine. The difference between iodine originally employed and the unabsorbed iodine is of course the amount of that element absorbed by the fat, and the number of grammes absorbed by 100 grammes of fat is called the iodine number.—(Dr. Laves, *Ap. Zt.*, 1901, p. 30.) H. V. A.

FERMENTS OF THE LEGUMINOSÆ.

The work of the ferments of sprouting seeds is continued by Bourquelot and Hérissey (*J. Ph. et Ch.*, 1900, 357). They extracted the ferments from sprouting fœnugreek, luzerne and scoparius seed and compared the action of same on starch of caroubier (the seed of Ceratonia siliqua) and on potato starch with that of diastase from malt, finding it totally different.

Diastase hydrolyzes potato starch so completely that the mixture no longer gives the iodine reaction, while the action on caroubier starch is much less than that of the leguminous ferment. The latter ferment, called seminase by the authors, on the other hand, scarcely affects potato starch, but completely hydrolyzes caroubier starch (starch of the horny albumen).

The seminase obtained from the three plants mentioned above is practically identical. Whether it is a single ferment or a mixture is yet to be studied. H. V. A.

ANAGYRINE.

The seeds of Anagyris fœtida, a papilionaceous plant of Southern France and Algeria, contain an alkaloid which was at first thought to be identical with cytisin. This alkaloid is obtained by percolation of seeds with 60 per cent. alcohol containing acetic acid, evaporation of solvent, removal of fat and resin by treatment with water and filtration; precipitation of gum, color, etc., from filtrate with lead acetate; and chloroformic extraction of alkaloid from the alkaline filtrate. Lastly, the chloroformic extract is purified by fractional crystallization of the alkaloids and their platinic chloride and mercuric chloride compounds—this complex method being necessary to separate the real cytisin from the peculiar alkaloid of anagyris—anagyrine. Cytisin is $C_{11}H_{14}N_2O$, anagyrine is $C_{15}H_{22}N_2O$, and in both alkaloids the O atom is neither in a hydroxyl nor in a ketone nor in an aldehyde group.

Cytisin is a secondary base (forming with alkyliodides a tertiary), while anagyrine reacts as a tertiary base.

Comparison of the two formulæ seems to show that anagyrine is butyl cytisin.

However, none of the efforts to convert cytisin into butyl derivatives—several successful!—yielded true cytisin. Anagyrine yields with barium permanganate a peculiar crystalline base, $C_{15}H_{20}N_2O_2$, which appears to be similar to the peroxides of tertiary bases studied by Merling and others. The physiological effect of anagyrine is different from cytisin.—(Dr. F. M. Littescheid, *Arch. Ph.*, 1900, 191.) H. V. A.

MALARIA AND THE MOSQUITO.

Progress in the investigation of the causation of malaria is proceeding steadily, and definite proof has now been obtained that the bite of a malarious mosquito causes malaria in a non-malarious district, also that if one lives in a malarious district and escapes being bitten by a malarious mosquito perfect health is retained. The latter is the more important fact, and we owe it to Dr. Louis Sambon and Dr. G. C. Low, who, as stated in an illustrated note which we published on July 7, have since May been living in the malaria-infested Campagna of Rome in a mosquito-proof house, and although a month of the experiment has still to run, Professor Grassi, a leading Italian physician, has telegraphed to Dr. Manson, who first formulated the mosquito-malarial theory, that the experimenters are in perfect health and have been all the time, although around them the inhabitants of the Campagna are malaria-stricken. Drs. Sambon and Low have taken no other precaution than that of the protection provided by the house; they have taken no anti-malarial physic, and have breathed the "malaria-stricken exhalations" which constitute the atmosphere of the Campagna. This is ample proof, therefore, that the old "exhalation" theory is wrong, and that we have to seek for the cause of malaria somewhere else. That the mosquito is the infection-carrier there can no longer be any doubt. Members of the Liverpool school who went out to the gold coast and were not bitten by mosquitoes did not take malaria; one member of the party who was bitten had a severe attack of the fever. But that was in a malarious district, and there was wanted by the skeptical proof of malarial infection by the mos-

quito in a non-malarious district. This has now been provided in London by a son of Dr. Manson, who allowed himself to be bitten by a malaria-infected mosquito. For the experiment mosquitoes (*Anopheles*) were raised from the egg in a laboratory, so that they had no opportunity of obtaining the fever parasites, and these were taken to Rome and allowed to suck the blood of patients in whom the parasites of tertian fever were ascertained to be present. The insects were then sent to the London School of Tropical Medicine and fed on vegetable juices until sufficient time had elapsed for the fever-germs to reach their venom-glands. Mr. P. T. Manson was bitten every second day by the insects until they died, usually about ten days after their arrival in London. The first batch was fed in London in the first and second weeks of July, the second at the end of August, and the last during the second week of September. Mr. Manson remained in perfect health until the morning of September 13th, when he was suddenly attacked by headache, bone-ache, lassitude, and loss of appetite, with rise of temperature to 102° F. On September 15th there was a distinct intermission during the forenoon. High fever, with temperature of 104° F., set in about 4 P.M. with delirium, and was relieved during the night by profuse diaphoresis. The same series of events recurred on September 16th, and on the morning of the 17th tertian parasites were found in his blood. The nature of the illness was verified, and the parasites were seen, not only by Dr. Manson himself, but by other competent observers. The delay in the appearance of symptoms is notable, but is believed to be due either to the condition of the insects or to the need for some lapse of time after the parasites are introduced into the blood before they multiply sufficiently to become effective causes of fever. Mr. Manson is not likely to sustain any permanent injury or inconvenience, as the tertian parasite is not virulent and is easily killed by quinine, which Mr. Manson has taken freely, and there has been no recurrence of the tertian symptoms. These signal proofs of the communicability of malarial fever by insects, and insects alone, once more attracts attention to the need for close study of the various species of mosquito. We are glad, therefore, to observe that the inquiry instituted in 1898 at the suggestion of a committee of the Royal Society by the Colonial Office is bearing fruit. The Governors of all the colonies were requested to have such collections made and sent to the Natural History

Museum, South Kensington, for examination and classification, and as a result considerably over 3,000 specimens of mosquitoes have been received at the museum. The work of identifying and describing the specimens was at first entrusted to Mr. E. E. Austen, the dipterist on the museum staff, but he joined the City Imperial Volunteers as a soldier and naturalist. Mr. F. V. Theobald, one of the few men in England who have studied mosquitoes, has carried on the work in Mr. Austen's absence, and is now engaged in the preparation of a monograph on mosquitoes, based on the collections at the museum. The combined collections contain a large number of species, the majority belonging to the genus *Culex*. Mr. Theobald has completed the genus *Anopheles*, which is the medium by which the malaria-parasite is transmitted from man to man. The genus is represented in the museum by twenty-two species, ten of which are new to science. The *Anopheles*, unlike the *Culex*, does not appear to have a wide distribution in regard to species, although the genus is world-wide. One of the greatest distances between any two localities for the same species is Formosa and the Straits Settlements. A long series sent from the Straits Settlements contained sixty-six *Anopheles* and seventy-two *Culex*. Some species of *Culex* seem to have a very wide distribution. Thus, one species has been sent from Japan, Formosa, Hong Kong, Malay Peninsula, India, South and West Africa, North and South America, West Indies and Gibraltar. The *Culex* is innocent of malarial propensities, so that interest is centered on the *Anopheles*, and the next thing we have to learn after Mr. Theobald has completed his classification is whether all the species are malaria-carriers. The subject is one which pharmacists of an inquiring turn of mind may find it advantageous to follow, and even the enterprising will find it not unprofitable.—(Editorial in *Chem. and Drug.*, 1900, p. 547.)

VEGETABLE ALKALOIDS, DETERMINATION OF, BY MEANS OF THE QUANTITY OF ACID REQUIRED TO FORM NORMAL SALTS.

In previous investigations it has been customary to disregard the theoretical quantity of acid required to combine with the various alkaloids, and a process has generally been considered satisfactory if the end reaction is sharp and concordant results are obtained. This gives considerable trouble in forensic and pharmaceutical work where the quantity of available alkaloid is small and very dilute acid

and alkaline solutions are employed. In this work N/50 sulphuric acid and caustic solutions were employed and the indicator solutions standardized by means of the standard acid or alkali, as required. The alkaloids were dissolved in an excess of the acid, 50 c.c. of this solution added to the standardized aqueous solution of the indicator, and the excess of acid measured by means of the alkaline solution. The following indicators, of the usual strength, were employed: azolithmin, iodo-eosin, methyl-orange, cochineal, phenolphtalein, lacmoid, ethyl-orange, uranine, hæmatoxylin, alkannin and Congo red. The results obtained are summarized in extensive tabulations and the relative efficiency of the indicators is given as follows.

The most suitable are printed in italics; the next best are enclosed in brackets; (*a*) indicates a somewhat indefinite end reaction; (*b*) the indicator is discolored, and (*c*) change of color reaction transitory.

Aconitine.—Iodo-eosin, *azolithmin*, hæmatoxylin, cochineal.

Atropine.—Iodo-eosin, [methyl-orange (*a*)], azolithmin, hæmatoxylin, *lacmoid*, cochineal, *uranine*.

Caffeine.—None are suitable.

Cocaine.—*Lacmoid*, uranine, cochineal, hæmatoxylin.

Codeine.—*Iodo-eosin*, (azolithmin), uranine, hæmatoxylin, cochineal, *lacmoid*.

Coniine.—*Iodo-eosin*, (methyl orange), uranine, [azolithmin (*a*)], hæmatoxylin (*c*), (alkannin), *cochineal*, *lacmoid*, Congo red.

Emetine.—*Iodo-eosin*, [azolithmin (*b*)], [uranine (*a*)], [hæmatoxylin (*a*)], *cochineal*, [*lacmoid* (*b*)].

Morphine.—(Iodo-eosin), *cochineal*, *lacmoid*.

Narceine.—None are suitable.

Narcotine.—(Methyl orange), *lacmoid*.

Papaverine.—*Lacmoid*.

Pelletierine.—(Iodo-eosin), uranine, *cochineal*, [lacmoid (*b*)], [azolithmin (*b*)].

Quinine.—*Azolithmin*, uranine, *hæmatoxylin* (*c*), lacmoid, in presence of ether.

Sparteïne.—Azolithmin, (uranine), *hæmatoxylin*, phenolphtalein, alkannin.

Strychnine.—Iodo-eosin, *azolithmin*, (uranine), hæmatoxylin, cochineal, (lacmoid).

Thebaine.—*Iodo-eosin*, uranine, (hæmatoxylin), *cochineal*, lacmoid (*a*).

Veratrine.—Iodo-eosin, hæmatoxylin, cochineal, *lacmoid*.

The low acid values are due to partial dissociation of the alkaloidal sulphate in aqueous solutions, a part of the acid belonging to the alkaloidal salt being neutralized by the alkali, while the free base separates out or remains dissolved in the colloidal state. In dissociations of this kind the base may not combine with the indicator, because of the relative instability of the indicator-alkaloid compound, which is especially the case if the indicator is a weak acid and the alkaloid is a weak base. Fairly good results may be obtained with a feebly acid indicator and a strongly basic alkaloid; the reverse, however, will not hold good. *High acid values* are generally obtained with methyl and ethyl-orange and Congo red in the titration of quinine and sparteïne. These are due to compounds of the indicator and the alkaloid, formed in solution, which require a considerable excess of acid to decompose.—(C. Kippenberger, *Ztsch. anal. Chem.*, **39**, 201.) L. F. KEBLER.

"STRENGTHENING" FLOURS FROM RUSSIA.

Within recent years there have been introduced into France from Russia several brands of flour for the purpose of improving and increasing the value and yield of bread made from flours deficient in gluten. The following results were obtained by Balland (*Comp. rend.*, **131**, 545) on the analyses of three brands:

Constituents.	"Champion."	"Hercules."	"Samson."
Water	9·90	10·70	11·00
Nitrogenous matter	29·48	22·11	16·43
Fatty matter	1·60	1·45	1·20
Amylaceous matter	58·22	64·94	70·65
Cellulose	0·20	0·25	0·27
Ash	0·60	0·55	0·45
Gluten, moist	82·80	64·50	46·40
Gluten, dry	29·10	22·00	16·00
Total nitrogen	4·717	3·537	2·628
Acidity	0·073	0·065	0·065

The above analyses indicate that these "strengthening flours" are simply mixtures of wheat and gluten flours. Their addition to over-bolted flours is undoubtedly valuable, in that it makes good

the deficiency of nitrogenous matter, but they will not raise the per cent. of phosphates, and the apparent increase in yield of bread is purely fictitious, being due to the additional water absorbed by the dried gluten. L. F. K.

SPURIOUS VENETIAN TURPENTINE.

G. Fabris (*Annali del Laboratorio Chimico Centrale delle Gabelle*, 1900, **4**, 143, from *Jour. Soc. Chem. Ind.*, **19**, 768).

Spurious Venetian turpentine, consisting of mixtures of rosin oil, colophony and oil of turpentine, have for some time past found their way into commerce, their color and consistency depending on the relative proportions of the several constituents. In general, such products are very thick and have a mingled odor of their component products. They are completely soluble in 95 per cent. alcohol, have acid value from 105 to 113·8; saponification number 113·6 to 119·2, and from 6 to 13 per cent. distils below 250° C. From these figures the following deductions as to composition are made: turpentine, 6 to 13 per cent.; colophony, 65·2 to 67·9 per cent.; and rosin oil, by difference, 19·1 to 28·8 per cent.

There is some possibility of confusing the genuine Larch or Venetian with these spurious products, yet there are several distinct differences. The Venetian turpentine invariably contains more than 15 per cent. of oil of turpentine, the acid value varies from 65 to 75, and the saponification number from 110 to 125.

The rosin oil can be detected by dissolving 5 grammes of the sample in 20 c.c. of 95 per cent. alcohol, adding a few drops of phenolphtalein and sufficient of a 10 per cent. solution of potassium hydroxide to render alkaline. In case of genuine Venetian turpentine a clear solution results, while the solution of an artificial product becomes turbid, and, on standing, oily drops of rosin oil separate.

L. F. K.

ALBUMIN MANUFACTURE IN CHINA.

In the *Chamber of Commerce J.* (Nov., 1900, p. 225) it is stated that the albumin industry established at Hankow lately has made substantial progress. The white of the egg is employed in numerous industries, but is principally employed in the manufacture of leather. All kinds of eggs are employed in the manufacture of albumin, but ducks' eggs are richest in white and, therefore, most in demand. The eggs

are broken, the white separated from the yolk, the latter poured into gigantic reservoirs, mixed with salt to prevent fermentation, thoroughly agitated, and shipped in barrels. The egg white is exposed to the air in open casks, in well-heated rooms, until it attains a certain degree of fermentation. Then it is drawn off by means of taps, placed into small open zinc vessels and allowed to stand some time; subsequently it is dried at a higher temperature, which transforms the egg albumin into dry friable cakes. In this form the article is packed into cases and shipped. At present five firms are engaged in this industry, three German, one Austrian and one French, who work up, in the aggregate, from 300,000 to 310,000 eggs daily.

L. F. K.

PHENYL-ETHYL ALCOHOL IN ROSE BLOSSOMS.

Ordinary rose oil as usually made never possesses the true odor of the rose. Many attempts have been made to obtain the true natural odor of the rose by means of the volatile solvents. It was found by H. Walbaum (*Ber.*, 1900, **33**, 2299) that an oil obtained in this way from the fresh leaves consisted for the greater part of phenyl-ethyl alcohol, while geraniol is the principal constituent of oil distilled with water, from fresh leaves. On extracting 90 kilos of the dried rose leaves by means of ether, distilling the extract in steam, then shaking the distillate with ether and evaporating the ethereal solution, there was left a brown oil which consisted for the most part of phenyl-ethyl alcohol. See also *Ber.*, 1900, **33**, 1720, and *Chemist-and Druggist*, 1900, **56**, 961. L. F. K.

ROSE OIL, GERMAN.

It has been found that German and Bulgarian rose oils consist essentially of geraniol and odorless hydrocarbons (Bertram and Gildemeister, *Jour. prakt. Chem.*, 1894, **49**, 185). Tiemann and Schmidt (*Ber.*, **29**, 923) also found citronellol in Bulgarian oil. Mixtures of the above do not possess the odor of rose oil, consequently there must be other odoriferous constituents present. H. Walbaum and K. Stephan (*Ber.*, 1900, **33**, 2302) determined to investigate this matter and for this purpose carefully fractionated, partly by steam and partly under diminished pressure, 11 kilos of German rose oil and examined the several fractions. This investi-

gation has established the presence of the following new constituents in German rose oil: normal nonylic aldehyde, citral, *l*-linalool, normal phenyl-ethyl alcohol and *l*-citronellol. It should be noted also that there were indications of other constituents in this oil. The pertinent observation is made that an explanation is lacking for the presence of only a trace of the phenyl-ethyl alcohol in ordinary rose oils and the large quantities of the same alcohol in extracted oils. L. F. K.

PREPARATION OF TERPIN HYDRATE.

Keutmann (*Pharm. Ztg.*, **43**, 296) finds that on mixing one part of hydrogen peroxide (per cent. ?), two parts of nitric acid and eight parts of oil of turpentine, then allowing the mixture to stand a few hours, a copious crop of terpin hydrate crystals will be formed. L. F. K.

THE PREPARATION OF AN EXACT STANDARD ACID.

C. Longuet Higgins (*Journ. Soc. Chem. Ind.*, **19**, 958) reviews the subject in a very satisfactory manner, and the reader is referred to the original communication for details. The method worked out by this author is similar to the one first presented by Mr. G. T. Moody, 1898, *Jour. Chem. Soc.*, **73**, 658, and consists in dissolving a given weight of pure dry hydrochloric acid in a definite weight of water. L. F. K.

CONSTITUENTS OF WEST INDIAN SANDALWOOD OIL.

Hugo von Soden and Wilhelm Rojahn (*Chem. Centr.*, 1900, 1274; *Pharm. Zeit.*, 1900, p. 878) separate amyrol into components. Of these the alcohol $C_{15}H_{25}OH$ is present in larger proportion, possesses boiling point, 299°; specific gravity, 0·987 at 15°, and a rotation of + 36°. The second alcohol appears to have the composition $C_{15}H_{23}.OH$ and to be optically inactive.

From West Indian sandalwood oil, 0·1 per cent. of amyrolin, $C_{14}H_{12}O_3$, has been isolated; it crystallizes from methyl alcohol in stout crystals, is colorless, odorless and tasteless; melts at 117°; dissolves in hot alcohol, giving the solution a blue fluorescence and in alcoholic potash solutions with a yellowish-green fluorescence. Amyrolin appears to be an aromatic compound of the character of a lactone.

PHARMACY LAWS AND LEGISLATION.

CONTRIBUTED BY PROFESSOR J. H. BEAL, SCIO, O.

Under this title it is designed to give each month a brief *résumé* of proposed and accomplished pharmacy legislation, and of decisions of importance to pharmacy boards and pharmacists. On account of space limitations, proposed legislation cannot be more than briefly mentioned, but bills enacted into law will be discussed and their principal features pointed out. Pharmacy boards and members of legislative committees and others are requested to send copies of such measures and news of this kind either to the editor of this JOURNAL or to Prof. J. H. Beal, Scio, O.

MINNESOTA STATE BOARD OF PHARMACY REPORT.

The citizens of Minnesota are fortunate in having a fairly good pharmacy statute, and a Board of Pharmacy that is more than fairly good, in fact one of the most efficient boards in the United States, the sixteenth annual report of which is a model of what pharmacy board reports should be.

The report shows 591 pharmacists enrolled on experience at the time the law was passed, 714 pharmacists enrolled by examination, and 169 assistant pharmacists.

During the year the board conducted forty-one prosecutions to a successful issue. Thirty-eight were for failure to keep a registered pharmacist in charge of the store, the fine being $50 in each case. Two were for failure to expose certificate of registration, with a fine of $10 each. In one case, cause of complaint not stated, the fine assessed was $150. The total of fines assessed was thus $2,070, which, with the costs added, shows it to be rather expensive to violate the pharmacy law in Minnesota.

The report also contains the minutes of the several meetings of the board for the year, the lists of questions asked, and an illustration showing the portable dispensing cabinets used in examining students in compounding and prescription work.

The finances of the board are in flourishing condition, the cash balance on hand at the close of 1900 being nearly twice that at the end of the preceding year.

NEW YORK.

Proposed pharmacy legislation is a live topic in New York State at present, a number of measures affecting pharmacy having been already introduced into the legislature.

Prior to the last session of the legislature, New York was afflicted with four distinct pharmacy laws, one for Erie County, one for Kings County, one for New York City, and one for the remainder of the State. After many futile efforts, the pharmacists of that State succeeded in procuring the enactment of a statute covering the entire State, and repealing the old ones.

It was not to be expected that a measure which attempted to reconcile so many conflicting interests could be permanently satisfactory, nor indeed was this the result. The present measure, while in many respects an improvement over the old condition of four separate laws and boards of pharmacy, still leaves much to be desired, and the present agitation must be expected to continue until either an entirely new measure has been enacted or until the present law has been amended into a more satisfactory shape.

Among the more important of the measures introduced up to date are the following:

The Donnelly Bill seeks to amend the law so as to permit all licensed druggists of the eastern section to participate in the election of the members of the board for that section, and also provides that registered assistants may become licensed druggists upon filing an affidavit as to the possession of the necessary experience; that the surplus left after paying the expenses of the board shall be paid into the State Treasury; authorizes the State Controller to examine the books of the board, etc.

The Costello Bill aims to amend the law by extending the lists of drugs which may be sold by country merchants, and requires the board of pharmacy to issue permits to compound medicines, fill prescriptions and sell poisons, to such retail dealers in general merchandise as shall satisfy the Board of Pharmacy as to their competency for such purposes.

The Weeks Bill makes it "a misdemeanor for any person, firm or corporation to sell or offer for sale any adulterated or altered drug, medicine, pharmaceutical preparation or chemical substance," under a penalty of not less than $25 nor more than $100 for each offence. The bill is said to be specially aimed at the sellers of adulterated borax.

The Bell Bill is supposed to be aimed at Christian scientists, osteopaths and similar fakirs, and enlarges the definition of what shall be considered as the practice of medicine, so that "Any per-

son shall be regarded as practicing medicine within the meaning of this act who shall profess to heal or who shall give treatment to any other person by the use of any remedy, agent or method whatsoever, whether with or without the use of any medicine, drug, instrument or other appliance, for the relief or cure of any wound, fracture or body injury, infirmity, physical or mental, or other defects or disease. This is not to be construed as prohibiting the manufacture, sale or use of any proprietary or patent medicine where no diagnosis is made by the maker or seller thereof; or the giving of temporary relief in an emergency by a registered pharmacist or any person, or the domestic administration of family remedies."

One of the numerous measures has already been passed, and awaits either the Governor's signature or his veto. This is the "Military Code Bill," and amends the law of 1900 which gave to pharmacists of the National Guard the rank of first lieutenant. The bill is said to have been pushed through the legislature by the surgeons and other officers of the National Guard, who are opposed to admitting pharmacists to rank because of social reasons. Whether this be true or not, the measure is a direct affront to the profession of pharmacy, and it is difficult to see how any self-respecting pharmacist can hereafter accept an appointment in the National Guard of the Empire State.

MASSACHUSETTS.

The Cloutier Bill seeks to amend the present law regulating the granting of liquor licenses to registered druggists by providing that the fact that a druggist has been convicted of a violation of the liquor law shall not operate as a forfeiture of his license, nor permit the pharmacy board to revoke his certificate of registration as a pharmacist.

Among other bills is one to increase druggist's liquor license from $1.00 to $500, one making only one signature necessary in recording sales of liquor, ~~one requiring~~ members of the Board of Pharmacy to be graduates of a college of pharmacy, and one requiring the use of preservatives in food or drink to be stated on the label. Another bill amends the present law against adulterations, and still another prohibits the substitution of one article when another is called for.

MISSOURI.

Bills have been introduced in the Senate and House to amend the present law so that physicians cannot register upon diplomas in medicine.

NEW JERSEY.

The New Jersey Legislature is wrestling with a bill to amend the present pharmacy statute by defining more clearly what shall constitute the unlawful practice of pharmacy, giving the State Board authority to employ counsel, enlarging the scope of examinations, and empowering the Board to employ inspectors for the purpose of detecting violations of the law.

One bill makes it unlawful for any person in the State to refill any bottle, and another prohibits the adulteration of drugs.

PENNSYLVANIA.

In this State bills have been introduced by Senator Snyder and Representative Stubb to amend the pharmacy law by "making additional regulations in regard to the practice of pharmacy, and the sale of medicines and poisons, enlarging and defining the powers of the State Pharmaceutical and Examining Board, and imposing penalties for violation."

The bills, if enacted, will make almost an entirely new pharmacy law for the State.

REPEAL OF THE STAMP TAX.

It is estimated that the repeal of the special tax on proprietary medicines will save $4,000,000 annually to the drug trade of the United States. The law takes effect July 1st, until when medicines must bear the same stamps as heretofore. The fact that the repeal was forced in the face of the most determined opposition is a striking evidence of the force which the pharmaceutical profession of the United States is capable of exerting when working with any approach to unanimity.

EDITORIAL.

PHARMACEUTICAL JURISPRUDENCE.

At the Montreal meeting of the American Pharmaceutical Association, Joseph Jacobs proposed (see Proc., 1896, p. 347) that measures

be taken by the Association to insure an exhaustive and accurate compilation of every law and every legal decision that bears upon the practice of pharmacy and the relation of the pharmacist to the public, the physician and State. He further suggested that this be recorded under the title of "Laws and Comments" and kept separate from other matters pertaining to education. His idea was the establishment of a department on Progress in Pharmaceutical Jurisprudence, similar to the department on Progress in Pharmacy. Others since that time have also referred to this need.

The reports of the Secretary of the Section on Education and Legislation of the A.Ph.A. must necessarily be more or less in the nature of statistics, as the office is seldom held by any one person for more than two years, and just about the time that he is competent to make a digest of such an important question his office is turned over to his successor, who again must serve an apprenticeship as his predecessors have done. These statistics are no doubt of value, and yet it was evidenced in the discussion at the last meeting (see Proc., 1900, pp. 283, 284) that there may be errors in the compilation owing to complications in the reports received from the secretaries of the various boards, and like many other statistics may really not give the information that is in accord with the facts. It therefore seems that what is most needed at the present time, when the pharmacists of the country are being roused to an appreciation of the value and power of organization and the possibilities of its effect upon legislation, is that some one who is competent for such a work shall present from time to time, as may be deemed necessary, a succinct account of the progress in Pharmaceutical Jurisprudence, this report to include amendments of old statutes and the enactments of new ones as they are made, and the recording of various court decisions of a nature affecting pharmacy, and all other matters relating to pharmacy laws and legislation; also a discussion of bills which are likely to be modified in their passage, if passed at all, and the criticism of individual statutes after they are enacted into laws.

The editorial management of the AMERICAN JOURNAL OF PHARMACY has not heretofore devoted much space to the matter of Pharmaceutical Jurisprudence, because the subject is one requiring the direction of an expert of unusual ability and training. It must be conceded that unless such a work, as outlined, is accomplished by an authority much harm can be done a cause requiring a strong hand for its

successful direction. The excellent work that has been done during the last five years in the American Pharmaceutical Association has been crystallized out largely under the direction of Prof. J. H. Beal, Scio, O. Beginning with his paper (Proc., 1896, p. 319) on "A Comparative Exhibit of Pharmacy Laws in the United States," and extending to his "Draft of a Model Pharmacy Law" (Proc., 1900, p. 284), Professor Beal has shown a remarkable grasp of the situation and has come as one whose influence is universally conceded to be beneficent to the cause of pharmacy legislation. Professor Beal has had an experience as a retail pharmacist, a training in law, a familiarity with the different methods of education, and a wide personal experience in securing legislative enactments, all of which qualify him to do just such work as is needed at this time to benefit the public, the State, the physician and the pharmacist.

It is with pleasure that we announce that Professor Beal has consented to present from time to time, as may seem necessary, to our readers a critical survey of the present status of pharmaceutical laws and legislation. It is particularly desirable that the secretaries of the various State Boards, the chairmen of the various committees appointed by local, State or national associations to consider new pharmacy laws or amendments to old pharmacy laws and that others who can in any way contribute in correspondence or in any other way, address Professor Beal or the editor of this JOURNAL, in order that nothing of importance shall fail to be recorded and that the pharmacists of the different States may profit by the actions of the others. As Professor Beal said (Proc., 1896, p. 345) on another occasion, "The existence in forty States of as many different laws of the same subject will yield approximately the same volume of experience in one year that could be gained in forty years with one legislative body. Moreover, it enables us to compare the merits of different enactments working side by side, under nearly the same conditions."

PHARMACEUTICAL MEETING.

The sixth of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1900–1901 was held on Tuesday, March 19, 1901. Prof. Samuel P. Sadtler presided. The meeting was one of the most successful of the year in attendance and interest manifested in the various matters presented.

Prof. Virgil Coblentz, of the College of Pharmacy of the city of New York, who is well known as a writer, teacher and expert in pharmaceutical and industrial chemistry, presented a paper on "Recent Developments in the Study of the Relationship between Chemical Constitution and Physiological Action of Organic Compounds." The speaker said that there is a close relationship between chemical constitution and physiological action, as shown by the fact that certain changes in chemical structure or constitution cause like changes in the physiological action of similar bodies; and, furthermore, that the addition of certain groups to compounds of different action produces bodies of similar physiological action, or are alike rendered inactive. (1) The methylating of different alkaloids of different physiologic action produces compounds which paralyze all the motoric nerve terminals like curarin. (2) The introduction of the carboxyl or the sulphonic acid groups into bodies of well-defined toxic properties results in a marked diminution or total destruction of their action, as, for example, morphine sulphonic acid in dose of 5 grammes is harmless. (3) Bodies containing a tertiary nitrogen, and possessing slight or no toxic properties, become very poisonous through reduction and formation of an imido group. Thus pyridin is more toxic than collidin. (4) The introduction of hydroxyl groups into aliphatic bodies modifies their action, this decreasing with their increase in number. Thus the presence of this group in caffeine destroys its effect. The influence of the hydroxyl group is observed in the various derivatives of morphine, as codeine, dionin, peronin and heroin. (5) The replacement of a hydroxyl by an alkyl rest renders the entire body chemically and pharmacologically more resistant to oxidation in the system. Thus the introduction of an oxyethyl group into caffeine gives the latter an additional narcotic action. (6) The introduction of chlorin into aliphatic compounds produces bodies of a more or less narcotic action, whereas, if the substituted body belongs to the aromatic series, active antiseptics result. (7) Iodine imparts to all bodies of both series strong antiseptic properties. (8) The researches of Loew seem to show that bodies with a double linkage are more toxic than the corresponding saturated ones.

In referring to the relationship between taste and chemical constitution, Professor Coblentz said that the hydroxyl and amido groups are taste generators, and that the presence of a carboxyl group produces in all cases a sour taste. The natural glucosides are bitter,

because they are mostly phenol derivatives. Disagreeable tastes are remedied usually by the conversion of the substance into an insoluble compound, which is then split up by the secretions in the intestinal canal.

The author, in closing, referred to the intestinal antiseptics, antipyretics, anæsthetics and proprietary combinations. The paper will be published in full in a later issue of this JOURNAL.

In the discussion which followed, Professor Sadtler said that if it were so easy as Professor Coblentz had indicated to make the compound desired, it would help to clear up such questions in litigation as involved the question whether or not the product is an invention. In reply to Wallace Procter as to whether the processes are not intricate, Professor Coblentz said that in some cases the process is exceedingly simple, as in the production of cocaine from ecgonine, whereas in others it is difficult. He further said that many compounds which readily break up in a test-tube do not on a manufacturing scale, and *vice versa.* The results which will be obtained cannot always be determined in advance. He said that there was a great amount of difficulty in this country to carry on this kind of work, and that there were a number of reasons why such work could be carried on more advantageously abroad than here; for one thing tax-free alcohol offers advantages to foreign manufacturers; also they are willing to employ from 50 to 100 chemists; to wait for results; and are satisfied with negative as well as positive results; the former being not infrequently more valuable to them than the latter.

Mr. M. I. Wilbert said that he had found difficulty in preparing sterilized solutions of cocaine and at the same time preventing their hydrolysis. Mr. Gordon said that inasmuch as distilled water was slightly alkaline, he had prepared sterile cocaine solutions with slightly acidified distilled water. Dr. Wendell Reber said that as a local anæsthetic to mucous membranes eucaine B deservedly holds a high place, and is widely used. Moreover, the recent experience of surgeons has demonstrated its almost perfect adaptability to the production of complete insensibility of the body below the waist line by injection of its solutions into the spinal column. He wished that Dr. Coblentz had said something about the synthesis of holocain and its relation to the rest of these synthetics. To the eye surgeon holocain is the nearest approach, so far, to the ideal local anæsthetic for

four reasons: (1) Its solutions may be boiled and remain stable (a point of immeasurable superiority over cocaine). (2) It is cheaper than cocaine. (3) It produces practically no dilatation of the pupil. (4) It does not loosen the epithelium with which the front surface of the eye (the cornea) is paved as does cocaine; and, finally (5), its point of greatest superiority, it possesses distinctly antiseptic properties, and is therefore also its own preservative when in solution. This renders it an ideal agent for the after-treatment of cinders and other non-penetrating foreign bodies in the eye. Its one disadvantage is that because of its extreme toxicity when internally used, it cannot be introduced under the skin or into the cavity of the spinal column, as can cocaine and eucaine B. For such purposes it is distinctly inferior to cocaine, and especially in spinal puncture to eucaine B.

Mr. F. W. E. Stedem said that in his work in urinalysis he had experienced considerable trouble in determining sugar when the patient had been taking various of the synthetics. Professor Coblentz commended the phenylhydrazine test for the detection of sugar in urine where the newer synthetics had been administered. Mr. F. T. Gordon employs the customary fermentation test. Professor Moerk said that there were several works in which the authors treated of the influence of synthetics on the usual tests employed in such work. Dr. E. Spaeth in his work considers a large number of synthetics, with means for detecting them in urine.

Professor Kraemer referred to the important work which is being developed in this country by both plant and animal physiologists in showing the relationship between the radicals, or especially *ions*, of certain chemical compounds in solution to plant and animal functions; and said that Dr. Jacques Loeb had recently shown, for instance, that there could be no heart beat unless sodium ions were present, and on this basis had shown the value of sodium chloride solutions in prolonging and saving life. He has even gone further and shown the important role that potassium and magnesium ions play in carrying on certain fundamental life processes.

Mr. Lyman F. Kebler presented a paper on "The Physical and Chemical Examinations of Oils of Sandalwood, Lavender and Thyme," in which he stated that the amount of some one important constituent was of more significance than physical tests. This paper will be published in full in a later issue of this JOURNAL.

Professor Coblentz said that in an examination that he had made of oils of bergamot and lavender he had found no relationship to exist between the ester content and aroma; in fact the inverse ratio seemed to hold. He said that perfumers judged these oils by odor and had not found the chemical tests to check the results based on odor; that the Italians were particularly adept in raising the ester value of these oils without increasing their aroma.

In the absence of the donor, Professor Sadtler exhibited a jar which had been presented to the College by Mr. Howard B. French, and which was used formerly in transporting olive oil across the Egyptian deserts on the backs of camels. It was interesting on account of it being a kind of container that is seldom, if ever, seen at the present time.

Mr. W. E. Ridenour presented a specimen of a bezoar, which was taken from the stomach of a Texas steer. Mr. Wiegand presented, in behalf of W. C. Wescott, Atlantic City, a decimal platform scale.

An interesting note was furnished by Mr. W. E. Ridenour on the value of the carat as expressed in the metric system. He said that some time ago he was called upon to weigh a diamond and to state the weight in jeweler's terms, carats and fractions. It was necessary to find the equivalent in the metric system, as his weights were of the latter, and in looking the matter up found the following clipping from the *Mining and Scientific Press*, October 27, 1900: "The weight by which diamonds and precious stones are calculated is: 4 grains = 1 carat; 157½ carats = 1 ounce, Troy. A fine diamond, perfectly white and pure, weighing 1 carat is worth $100; 2 carats, $400; 4 carats, $1,100; 5 carats, $1,750."

The diamond weighed ·327 gramme, and according to the above data he reported its weight to be 1¼ carats. His report was made in the presence of the diamond salesman, who became indignant, as he had claimed the weight to be 1 carat $\frac{1}{2}$ — $\frac{1}{16}$ and $\frac{1}{32}$. The diamond was subsequently taken to several jewelers and the weight of 1 carat $\frac{1}{2}$ — $\frac{1}{16}$ and $\frac{1}{32}$ was verified in each case. Mr. Ridenour then weighed several 1 carat weights and found them all to weigh ·205 gramme, being ·055 gramme lighter than stated in the *Mining and Scientific Press*. This was subsequently confirmed by Mr. Henry Troemner, Philadelphia; so therefore 1 carat = ·205 gramme = $3\frac{2}{13}$ grains.

H. K.

THE AMERICAN

JOURNAL OF PHARMACY

MAY, 1901.

CONTRIBUTIONS FROM H. M. GORDIN.

(*Concluded from p. 168.*)

NUX VOMICA.—STANDARD METHOD.

This drug is very difficult to exhaust completely. After trying several neutral, as well as acid menstrua, the following method was found to work well. Though in this method acid is used, the method can nevertheless be used as a standard, it being well known that the strychnos alkaloids are not easily affected by dilute acids.

Ten grammes of drug in No. 60 powder were moistened in a screw top jar with 5 c.c. of a menstruum containing 75 per cent. alcohol and 2 per cent. phosphoric acid. The jar was then covered and set aside for forty-eight hours. The drug was then put in a small percolator, the jar washed out several times with the same menstruum, the washings poured on top of the drug and more of the same menstruum added till the liquid reached the lower orifice (about 23 c.c. menstruum was used). The percolator was then closed and set aside for twelve hours. The percolation was then continued very slowly with a menstruum containing 75 per cent. alcohol and about one-quarter of 1 per cent. phosphoric acid till about 200 c.c. were obtained. The first 10 c.c. were received into a 100 c.c. measuring flask and the rest concentrated in vacuo, first at about 45° C., and then at ordinary temperature till the percolate was reduced to about 60 c.c. The concentrated extract was then added to the reserved portion, the vessel in which the concentration took place washed with water and the whole made up to 100 c.c. This was shaken about one-half hour with talcum powder,

filtered, and from 20 c.c. of the filtrate (= 2 grammes of drug), after making alkaline with ammonia, the alkakoids were shaken out three times with a mixture of three parts of ether and one part chloroform, using 30 c.c. of this mixture each time. After distilling off the ether-chloroform, the alkaloids were taken up with a little chloroform, then 20 c.c. $\frac{N}{40}$ acid added, and the last trace of chloroform removed by a current of air. The final estimation was then made alkalimetrically, using $\frac{N}{40}$ alkali for residual titration and Mayer's reagent as precipitant. The dregs in the percolator were tested for alkaloid as described above. None were found either by reagents or by taste.

The amount of $\frac{N}{40}$ acid consumed by 2 grammes of the drug assayed by this standard method was found to be 7·2 c.c. = 3·27 total alkaloids (taking the mean factor of strychnine and brucine).

Having assayed the drug by this method, method A was applied, continuing the boiling for six hours, but the results were far below those obtained by the standard method, but method B, after reducing the drug to a very fine powder (about No. 100), gave results approaching very near those obtained by the standard method.

Two assays were then made by method B, digesting 4 grammes of the finely powdered drug with 50 c.c. of modified Prollius' fluid, shaking (in shaker) four hours, drawing off 25 c.c. (= 2 grammes drug), and shaking out with acid water. The acid solution was made alkaline with ammonia, and the alkaloids shaken out three times with a mixture of two parts chloroform and one part ether, using 30 c.c. of this mixture each time. The ether-chloroform was distilled off completely, the residue taken up with 20 c.c. $\frac{N}{40}$ H_2SO_4 and a little chloroform, and the chloroform removed by blowing air into the flask. The estimation was finished in the regular way.

Method Used.	$\frac{N}{40}$ Acid Consumed by 2 Grammes.	Percentage of Total Alkaloids.
Standard	7·2 c.c.	3·27
B	6·9 c.c.	3·14
B (duplicate)	6·8 c.c.	3·09

The results obtained by method B are a little lower than those obtained by the standard method, but they are the best I was able

to obtain from several other methods. Possibly by further trials another method might be found, the results of which will approach those obtained by the standard method better than those obtained by method B.

CINCHONA BARK.

After several trials the method given below was found to give good results. As in the case of nux vomica, an acid menstruum had to be resorted to, no neutral menstruum with or without glycerine giving complete exhaustion. As acetic acid did not improve much the exhaustion, diluted hydrochloric acid was taken. The assay was made with a view of estimating the total alkaloids as well as the ether soluble alkaloids. As alkalimetric factor of ether soluble alkaloids, the mean diacid factor of quinine and cinchonidine was taken, which for $\frac{N}{40}$ acid is 0·00385.[1]

THE STANDARD METHOD.

Ten grammes of cinchona bark in No. 60 powder were moistened with 5 c.c. of a mixture containing 50 per cent. alcohol and 2 per cent. hydrochloric acid, and the extraction finished in the same way as that of nux vomica, using hydrochloric acid instead of phosphoric. After concentration in vacuo, the liquid was made up to 100 c.c., filtered, and 25 c.c. of the filtrate (2·5 grammes drug), after making strongly alkaline with sodium hydrate, were shaken out three times with a mixture of three parts ether and one part chloroform, using 30 c.c. each time. The ether-chloroform was shaken up with a little calcined magnesia, filtered into a tared flask, the vessel and filter well washed with ether-chloroform, and the liquid completely removed by distillation. After drying the flask at 130° C. for one hour, it was cooled in desiccator and weighed. This gave the total alkaloids in 2·5 grammes of drug.

To the flask containing the total alkaloids, 10 c.c. absolute ether and a few grammes coarse clean quartz was added and the flask shaken in a horizontal plane till all the adhering matter was rubbed off by the quartz from the walls; the liquid was then filtered through a small dry filter into another flask, the first flask, the quartz and the filter washed three times with absolute ether, using 5 c.c. each

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[1]As will be shown in a subsequent paper.

time, and the ether completely distilled off. The residue of the ether soluble alkaloids was now taken up with a little chloroform and 40 c.c. $\frac{N}{40}$ sulphuric acid, the chloroform removed by a current of air from foot bellows and the alkaloids estimated alkalimetrically, using $\frac{N}{40}$ alkali for residual titration, and a 2 per cent. solution of iodine in potassium iodide as precipitant. The completeness of exhaustion was proved by testing the dregs in the percolator, as described above.

Using this method as a standard, several other more expedient methods were tried. None gave as good results when compared with the standard as method B. Two assays were then made by method B, using 10 grammes[1] of the same bark reduced to a very fine powder for each assay, digesting with 100 c.c. modified Prollius' fluid, drawing off 25 c.c. (= 2·5 grammes of drug) and shaking out with acid water. The acid solution was then shaken out with light ether-chloroform and the assay finished exactly as in the standard method. The results were as follows:

Method Used.	Total Alkaloids from 2·5 Grammes.	$\frac{N}{40}$ Acid Consumed by 2·5 Grammes.	Percentage.	
			Total.	Ether Soluble.
Standard . . .	0·1702 gramme	23·2 c.c.	6·81	3·57
B	0·1682 gramme	23·4 c.c.	6·73	3·60
B (duplicate) .	0·1690 gramme	23·3 c.c.	6·76	3·58

As method B gives practically the same results as the standard method, this method B should be adopted for the assay of cinchona bark.

IPECAC.

This is another drug which is extremely difficult of exhaustion. The following method was found to give the best results:

Ten grammes of drug in No. 60 powder were shaken two days in a shaker with 100 c.c. of a menstruum containing 50 per cent. alcohol and 2 per cent. acetic acid, the whole was then thrown into a percolator, returning the first parts to the percolator till the percolate came out clear, and the percolation continued with 50 per cent. alcohol containing about one-quarter of 1 per cent. of acetic acid, till exactly 600 c.c. were obtained. 150 c.c. of the percolate (= 2·5

[1] If the drug is of a poor quality, 20 grammes should be taken for the assay and both the menstruum and the aliquot part doubled.

grammes) was made alkaline with ammonia and shaken out four times with a mixture of four parts ether and one chloroform, using 200 c.c. of this mixture each time. The ether-chloroform was distilled off completely, the residue taken up with about 10 c.c. of acidulated (1 per cent.) water, and the liquid filtered into a small separator, washing the vessel from which the ethereal liquid was distilled and the filter repeatedly with small quantities of acidulated water. The alkaloid was now shaken out with heavy ether-chloroform (1 ether, 2 chloroform) and ammonia, and the ether-chloroform completely distilled off. The residue was taken up with a little chloroform and 20 c.c. $\frac{N}{40}$ sulphuric acid, and after the removal of the chloroform by a current of air, the assay was finished alkalimetrically, using Mayer's reagent as precipitant. The dregs in the percolator were tested for alkaloid as usual, but none was found.

Using this as a standard, I assayed the drug by many different methods, but no method gave as good results as those obtained by the standard method. Those obtained by method B, after reducing the drug to a No. 100 powder, came nearest to those obtained by the standard.

Method Used.	$\frac{N}{40}$ Acid Consumed by 2·5 Grammes.	Percentage of Alkaloid.
Standard	11·5 c.c.	2·92
A	9·6 c.c.	2·43
B	10·2 c.c.	2·59

It will be noticed that 0·00635 was taken as the factor of emetine for each cubic centimetre of $\frac{N}{40}$ acid. This is based upon the assumption that the formula of emetine is $C_{30}H_{40}N_2O_5$ (Kunz Krause, *Arch. d. Pharm.*, 225, 461 : 232, 466) and that the salts of emetine correspond to the formula $C_{30}H_{40}N_2O_5\ 2\overline{A}$ where $\overline{A}$ is one molecule of a monobasic acid. As this formula is not yet accepted all around,[1] the above factor will possibly have to be slightly changed. But as in the present case determinations were only made with a view of comparing the results obtained by the standard method with those obtained by the simpler methods, it is immaterial what factor we use provided it be the same in all cases. The only fact that re-

[1] Lefort and Wurz, *An. Chim. Phys.* (5), 12, 247 ; Glénard, *ibid.*, 8, 233 ; Paul and Cownley, *Pharm. J.* (3), 24, 61.

quires to be proved is that emetine, like most other alkaloids, can be exactly estimated by my alkalimetric method.[1] Though this could be admitted *a priori*, for the reason that emetine is precipitated by Mayer's and Wagner's reagents from extremely dilute slightly acid solutions, it was thought best to bring experimental proof of the exactness of the alkalimetric estimation of this alkaloid. For the establishment of this fact also it is immaterial what the real formula of emetine is. All that we need to prove is that if we standardize our acid and alkali with definite amounts of this alkaloid, and in this way deduce a factor for our standard liquids, this factor will give exact results with other quantities of the same alkaloid.

A dilute (about $\frac{N}{40}$) solution of sulphuric acid was standardized against a dilute solution of KOH, using phenolphtalein as indicator, so that the acid and alkali corresponded exactly cubic centimetre per cubic centimetre. 0·0926 gramme of emetine (Merck's) was now dissolved in 50 c.c. of this dilute acid contained in a 100 c.c. measuring flask. An excess of Mayer's reagent was added, and the flask filled up to 100 c.c. After a few shakings the precipitate separated out completely and the supernatant liquid became perfectly transparent. The liquid was now filtered, and in 50 c.c. of the filtrate the excess of acid determined by means of the alkali. It was found that the 0·0926 gramme emetine consumed 14 c.c. of our acid. Hence 1 c.c. of our acid was equivalent to 0·0066 gramme of our emetine.

Two samples of the alkaloid were now weighed out and the amounts estimated exactly as above, using the factor 0·0066 for each cubic centimetre of acid.

	Emetine Taken.	Our Acid Taken.	Our Acid Consumed.	Emetine by Factor 0·0066.
(1)	0·1829	75 c.c.	27·6 c.c.	0·1822
(2)	0·1071	30 c.c.	16·4 c.c.	0·1082

We see that the alkalimetric method gives as good results with emetine as with quinine,[2] cinchonidine,[2] morphine, atropine, cocaine, strychnine, hydrastine, caffeine and acid salts of berberine.[3]

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[1] The application of the method to the cinchona alkaloids I shall show in my next paper.

[2] Will be shown later.

[3] This will be shown in another paper.

II. ASSAY OF CONIUM SEED OR LEAVES.

The assay of this drug presents considerable difficulty. Owing to the volatility of coniïne even at ordinary temperature, its solutions in immiscible solvents cannot be evaporated without loss, and as the alkaloid is not completely precipitated by Mayer's or Wagner's reagents, it cannot be estimated by my general method. The method which I have found to give excellent results is a modification of the method of Cripps,[1] and its details are as follows:[2]

Put 20 grammes of finely powdered conium into a 300 c.c. glass-stoppered bottle, pour in 200 c.c. of a previously prepared mixture of one volume of chloroform and three volumes ether, shake about five minutes, add 10 c.c. liquor potassa, shake frequently during four hours, and set aside over night. Pipette off 100 c.c. of the clear liquid into a 300 c.c. flask, add 10 c.c. of a 2 per cent. solution of oxalic acid in alcohol and mix well. Distil off the liquid completely, removing the last traces by blowing air into the flask while keeping it on the water-bath. Let cool, add 10 c.c. absolute alcohol, warm gently and cool again. Filter the alcoholic solution into a wide beaker, washing the flask, and filter three times with 5 c.c. each time of absolute alcohol. Evaporate the alcohol almost completely from a warm water-bath, add 10 c.c. water and pour into a 25 c.c. measuring flask, cool, and fill up to the mark with water. Add about 2 grammes talcum, shake well and filter through a small dry filter. Pipette off 12·5 c.c. (= 5 grammes drug) into a 100 c.c. separator, add 25 c.c. petroleum ether (boiling below 60° C. and leaving no residue on evaporation) and 5 c.c. of a 10 per cent. solution of KOH. Shake well and set aside until the liquid separates into two layers. Draw off lower layer into a 50 c.c. separator, add to it 20 c.c. petroleum ether, and shake. After separation into two layers, draw off lower layer into a beaker and pour contents of second separator into the first one. Return the aqueous liquid to the smaller separator and shake it again with 20 c.c. petroleum ether. Draw off aqueous layer and pour the petroleum ether from the second into the first separator.

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[1] *Pharm. J. Trans.* (3), 18, 13, 511; Allen, "Commerc. Org. Anal.," Vol. III, part II, 1892, 176.

[2] Later on I intend to test the exactness of this method by comparing its results with those obtained by some standard method as given in the previous paper.

Test a few drops of the aqueous liquid, after acidulating, with Wagner's reagent. If no reaction, reject it. If a reaction is obtained, shake the liquid again with 20 c.c. petroleum ether in the second separator, reject aqueous liquid and transfer the petroleum ether from the second to the first separator. Now add about 0·5 gramme MgO to the petroleum ether and shake well about fifteen minutes. Filter into a 300 c.c. flask, washing separator and filter repeatedly with petroleum ether and keeping funnel covered with a watch-glass. Add 50 c.c. of a perfectly clear saturated solution of HCl gas in absolute ether,[1] mix well and distil off the solvent from a warm water-bath completely, removing last traces by means of a current of dry air. Now add to the flask 25 or 30 c.c. $\frac{N}{40}$ $AgNO_3$ and then 5 c.c. 10 per cent. HNO_3. Put on water-bath, and when the supernatant liquid becomes clear, cool the flask, transfer its contents into a 100 c.c. measuring flask, and make up the whole to 100 c.c. Filter, add to 50 c.c. of the filtrate 5 c.c. test solution of ferric alum and titrate the excess of silver nitrate with $\frac{N}{40}$ potassium sulphocyanate in the usual way.

The number of cubic centimetres of $\frac{N}{40}$ $AgNO_3$ consumed by the 5 grammes drug multiplied by 0·0635 gives the per cent. of coniine in the drug.

III. ASSAY OF FLUID EXTRACT CINCHONA.

In a previous paper[2] I have given a general method for the assay of fluid extracts. As given there, the assay of fluid cinchona gives only the total alkaloids, but as it seems desirable to have a method that would show both the total and the ether soluble alka-

[1] If water be present in the ether, the ethereal solution of HCl will be turbid, and when the ether is distilled off from the coniine hydrochloride, the acid becomes concentrated in the last aqueous portions and colors the alkaloid greenish-red. If ether containing some water be saturated with gaseous HCL and the solution set aside for a few hours, all the water will settle down, taking along most of the HCl; if the ether be now poured off from the aqueous layer and again saturated with HCl, it will be perfectly clear and free from water. The HCl is best generated by dropping commercial hydrochloric acid from a dropping funnel into concentrated acid and washing the gas by passing it through a small quantity of sulphuric acid.

[2] *Arch. d. Pharm.*, 1900, 340; Proceed. A.Ph.A., 1900, 125.

loids, I propose the following method which has given me very good results:

Put 10 c.c. of the fluid extract into a 50 c.c. measuring flask and fill up to the mark with a 2 per cent. solution of sulphuric acid. Add about 1 or 2 grammes powdered talcum, shake vigorously a minute or two and filter through a dry filter. By means of a pipette or a burette transfer 25 c.c. (= 5 c.c. extract) into a separating funnel having a capacity of about 125 to 150 c.c. Add into the separator 40 c.c. of a mixture of three volumes of ether and one volume of choloroform, then add a considerable excess of a 10 per cent. solution of potassium hydrate, and shake well a few minutes. Set aside until the mixture has separated into two layers. There is generally no emulsion at all. Should there be one, the addition of a little more potassium hydrate will generally destroy it. Draw off the lower layer into a second smaller separating funnel, add to it about 20 c.c. of the same ether-chloroform mixture and shake again a few minutes. After separation into two layers, draw off the lower layer into a beaker and carefully pour the ethereal liquid from the smaller into the larger separator. Return the aqueous liquid to the smaller separator and shake out once more with about 20 c.c. of above ether-chloroform mixture. When the liquids have separated into two layers, draw off the lower layer, which can now be rejected, and carefully pour again the ethereal liquid from the second into the first, larger separator. Now add into the separator 1 gramme of calcined magnesia, and shake until the ethereal liquid, upon a few minutes' standing, separates out crystal clear. If it does not become perfectly clear, add a little more magnesia and shake. Now filter through a dry filter into a light tared flask, washing the separator and the filter repeatedly with ether, and distil off the ethereal solvent completely, taking care to prevent loss by spurting.[1] Dry the flask for two hours at 130° C., and after cooling in desiccator, weigh. The weight multiplied by twenty gives the per cent. of total alkaloids in the extract.

For the estimation of ether soluble alkaloids, add into the flask a few grammes of clean coarse quartz and then 10 c.c. of stronger ether, then give the flask a circular motion in a horizontal plane till all adhering matter is detached from the sides of the flask. Now

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[1] This can be done by laying the flask on its side.

filter the ethereal solution into a small flask, washing the quartz and the filter three or four times with stronger ether, using 5 c.c. each time. Add to the ethereal solution 20 or 25 c.c. of $\frac{N}{10}$ H_2SO_4, mix carefully by gentle rotation, and distil off the ether completely, removing the last traces by a current of air. Cool and transfer the acid solution to a 200 c.c. measuring flask, washing the distilling flask repeatedly with water. Add to the measuring flask an excess of Wagner's reagent, make the liquid up to 200 c.c. and shake till supernatant liquid is perfectly clear but dark red. Filter off 100 c.c., decolorize with enough sodium thiosulphate solution and titrate excess of acid with $\frac{N}{100}$ potassium hydrate, using phenolphtalein as indicator. The number of cubic centimetres of $\frac{N}{10}$ acid consumed by the 5 c.c. of the extract multiplied by 0·308[1] gives the percentage of ether soluble alkaloids in the extract.

LABORATORY OF
THE WM. S. MERRELL CHEMICAL COMPANY,
Cincinnati, O.

OXYGENATED PETROLATUM.

BY M. I. WILBERT.

For several years a proprietary preparation has been on the market known by and sold under the trade-marked name "Vasogen." This article is claimed to be "a more or less oxygenated mineral oil that combines readily with active medicaments, for which it acts as an ideal vehicle, facilitating their absorption and intensifying their activity." The claims made by the manufacturers in favor of this preparation, its usefulness and advantages, are so numerous and sweeping that the American agents have been able to create quite a demand for several of the preparations of Vasogen, despite the almost prohibitory price asked for them in this country.

In Germany this and similar preparations of mineral oils seem to be better known and more extensively used. Quite a number of articles have appeared, from time to time, in the medical journals of Germany, reporting on the use and advantages of oxygenated vase-

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[1] This factor is obtained by taking the mean diacid factor of quinine and cinchonidine; the exactness of the factor will be shown in my next paper.

line as a base and vehicle for active drugs. The writer's attention was especially attracted by an article, contributed to the *Pharmaceutische Centralhalle* (1900, p. 631), by G. Roch, in which the author describes "Vasogen" and its physical properties, and also gives a formula for making an article that is nearly identical in appearance and in many of its other qualities. The formula given by Roch is as follows: Liquid paraffine, 100; oleic acid, 50; aqua ammonia, Ph. Ger., 25; alcohol, 10. Mix in a flask or beaker and heat on a water-bath, stirring constantly, until the liquid is perfectly clear and transparent. The resulting product is practically a solution of an ammonia soap in liquid paraffine.

A preparation of this kind seemed to offer so many possibilities for practical application that the writer was induced to make some experiments with a view of still further simplifying the formula, so as to avoid, if possible, the rather tedious process of boiling. The following formula was finally adopted as giving a satisfactory product with little or no possibility of failure, even in the hands of the veriest tyro: Liquid paraffine, 100; oleic acid, 50; spirits of ammonia, U.S.P., 25. Mix. The resulting mixture is a yellow, oily liquid that readily dissolves iodine, salol, salicylic acid and many of the alkaloids, mixes readily with chloroform and the essential oils, and makes a stable emulsion with water in almost any proportion. The alcohol remaining in the preparation does not seem to be a disadvantage, or to interfere in any way with the properties of the compound. For these reasons it has not been deemed necessary to get rid of it.

It has been the practice, at the German Hospital, to designate distinctive compounds and substitutes for proprietary preparations with a more or less original and descriptive title, the object being to facilitate the writing of orders or prescriptions during the busy hours of the day, and to avoid, if possible, any violation of the existing patent or trade-mark laws of the country. Following this established precedent, the name or title decided on for this mixture was a combination of the initial parts of the words petrolatum and oxygen, and it is as "Petrox" that we shall refer to this compound in the remaining portion of these remarks.

Petrox, in addition to its solvent action on many of the more active medicinal compounds, also facilitates the absorption of these drugs when applied to the skin or mucous membranes. The exten-

sive employment of a number of the possible compounds has demonstrated their usefulness in quite a variety of ways. To enumerate some of these, we may say that, as a simple lubricant for massage, this combination offers the advantage of being smoother and more slippery than many simple oils, more cleanly than starch or talcum, and in addition to this, any excess is readily washed away with soap and water.

As a liniment, it makes a good vehicle for the administration of such drugs as chloroform, camphor, turpentine or any of the volatile oils. As an inunction, it facilitates the absorption of such active remedies as iodine, creosote, guaiacol, ichthyol and salicylic acid. As a local application it is useful, and makes an excellent vehicle for such drugs as iodoform, beta-naphthol, sulphur, tar and carbolic acid. In addition to this, it may be used as a vehicle for the internal administration of such drugs as iodine, guaiacol, creosote and many other more or less caustic and irritating drugs and compounds.

When any of these preparations are to be taken internally, the patient should be directed to put the required dose of the petrox compound into a bottle with the required amount of water or other liquid, and give the mixture a vigorous shake, so as to thoroughly incorporate or emulsify the active ingredient or drug with the liquid.

In addition to this liquid petrox, a solid form, to be used as an ointment base, is readily made by substituting a hard petrolatum for the liquid. For this solid preparation sufficient heat must be applied to melt the petrolatum, the oleic acid is then added, and just before the mixture has cooled sufficiently to set, the spirit of ammonia is added, and the whole mass is then stirred until cold. This mixture answers admirably for ointments where the absorption of the active medicinal ingredient is the chief object sought, and, therefore, it may be used to advantage with such drugs as mercury, potassium iodide, sodium salicylate and many others.

There are interesting possibilities in any or all of these combinations and the base itself is sufficiently inexpensive to warrant the making of a quantity by the pharmacist, and in turn calling the attention of his neighboring physicians to its possibilities, advantages as a vehicle for the external and also internal administration of many active drugs.

FEBRUARY, 1901.

PHYSICAL AND CHEMICAL EXAMINATIONS OF OIL OF SANDALWOOD, LAVENDER AND THYME.

By Lyman F. Kebler.

The quality of an essential oil is influenced in many ways, the locality in which the plant is grown, nature of the soil, humidity of the air, drought, elevation, cultivation, methods of distillation, etc. For example, lavender oil prepared from flowers grown in the lower mountainous regions of the Alps is inferior to that distilled from flowers collected at an elevation of 5,000 feet, and the oil obtained from flowers cultivated in England is of a much different quality than that made from the wild alpine flowers. Prolonged distillation undoubtedly has a marked influence; oxidizing some products and decomposing others. Mr. H. Laval,[1] in a very interesting and instructive paper on lavender oil, deals, in part, with the various distillation methods employed, and according to his observations it would not be surprising to meet with as many qualities of oil, from the same locality, as there are methods of distillation employed.

In order to differentiate between good and poor oils, the nasal organ as well as physical and chemical methods are resorted to. A well trained and experienced nose is probably very difficult to dispense with in selecting oils for certain kinds of preparations. We are, however, coming more and more to determine the value of an oil by the amount of the most essential constituent contained in it. Just as the per cent. of morphine determines the value of opium, or quinine that of calisaya bark, or strychnine nux vomica, so the amount of cinnamic aldehyde determines the value of oil of cassia, and linalyl acetate and santalol are valuable factors in determining the quality of oils of lavender and sandalwood, respectively. But even here we have conflicting opinions; for example, one source of information tells us that the higher the per cent. of ester the better is the oil, from another source we learn that an extended investigation shows that an oil containing from 25 to 30 per cent. of ester is superior to an oil containing from 35 to 40 per cent. or over. There are certainly good reasons for such differing views. The high testing ester oil may have had its aroma injured in some way as by distillation or careless keeping, or certain esters may have been added to an inferior oil to bring up the per cent. of ester. Again,

[1] 1886, *J. de Pharm. et de Chim.*, 5, 13, 593.

some of the celebrated English lavender oils contain but a low per cent. of ester, which would indicate that the ester is not the only factor to be considered in selecting an oil. In fact it happens occasionally that the nose and the per cent. of ester are entirely at variance with each other on oils obtained from the same locality.

During the past year the writer has had occasion to examine a goodly number of the above oils and herewith gives the results of his work.

OIL OF SANDALWOOD.

This oil is probably looked on with more suspicion than any other. It is claimed by some that in order to be sure of getting the genuine article it was necessary to resort to manufacturing it themselves. The writer's experience has been that reliable manufacturers handle the genuine article. That an oil is pure can readily be determined, for the physical and chemical constants have been so thoroughly worked out that there cannot be much doubt of their reliability; these are, specific gravity at 15° C., 0·97 to 0·978, readily soluble in five volumes of 70 per cent. alcohol, optical rotation from — 17 to 19° at 25° C. in a 100 millimetre tube, santalol at least 90 per cent.

Sample No. 1, in the table following, was made by the writer from a wood that yielded 5·5 per cent. of oil, and it can readily be seen that the constants obtained fall well within the above limits. The methods for obtaining the above constants are simple and easily available, except the one for estimating the santalol, which will be given here.

Into a flask, provided with a reflux condenser, place 20 grammes of the oil, add an equal volume of acetic anhydride (not anhydrous acetic acid) and 2 grammes of fused sodium acetate; then gently boil for about two hours. Wash the mixture first with water, then with a solution of sodium hydrate, then with water again; finally dry the resulting oil with anhydrous sodium sulphate. Of this dried product, place from 2–5 grammes into a flask provided with a reflux condenser, add an excess of normal alcoholic potassium hydrate, and boil for half an hour. Ascertain the amount of alkali consumed by titrating back the excess, with normal sulphuric acid. From the data thus obtained the amount of santalol is readily calculated by the following formula:

$$P = \frac{a \times 22{\cdot}2}{s - (a \times 0{\cdot}042)}$$

P = santalol; a = number of c.c. of normal alkali consumed; and s = the amount in grammes, of the acetylized oil, used for saponification.

The following equations represent the reactions involved:

$$C_{15}H_{25}OH + (C_2H_3O)_2O = C_{15}H_{25}O.COCH_3 + CH_3CO_2H$$
Santalol + acetic anhydride = Santalol acetate + Acetic acid.

$$C_{15}H_{25}O.COCH_3 + KOH = C_{15}H_{25}OH + CH_3CO_2K.$$
Santalol acetate + Potassium hydrate. = Santalol + Potassium acetate.

The samples of oil examined gave the following results:

Number.	Specific Gravity.		Per Cent. of Santalol.	Optical Rotation.	Solubility in 70 Per Cent. Alcohol.	Santalol Esters. Per Cent. of.
	15° C.	25° C.				
1	0·9767	0·9724	97·16	—17° 15′	1 in 5	3·06
2	0·9727	0·9707	93·64	—18° 16′	1 in 5	4·10
3	0·9747	0·9739	91·70	—14° 56′	1 in 5	2·93
4	0·9666	0·9601	90·12	—	1 in 5	1·48
5	0·9716	0·9685	92·87	—17° 2′	1 in 5	1·43
6	0·9626	0·9600	75·00	— 7° 4′	1 in 5	2·67
7	0·9721	0·9681	96·34	—16° 36′	1 in 5	—
8	0·9713	0·9678	94·53	—16° 56′	1 in 5	3·61
9	0·9734	0·9696	90·87	—13° 48′	1 in 5½	—

Remarks.—No. 6 is undoubtedly adulterated. Nos. 3, 4 and 9 fall below the standard, yet the analyst would hardly call them adulterated, but rather of secondary quality. The percentage of ester does not appear to be a deciding factor with these.

OIL OF LAVENDER.

An examination of four samples gave the following results:

Number.	Specific Gravity at 15° C.	Solubility in 70 Per Cent. Alcohol.	Optical Rotation.	Per Cent. of Ester.
1	0·8985	1 in 3	—6° 6′	25·70
2	0·8989	1 in 3	—2° 54′	34·36
3	0·8892	1 in 3	—5° 9′	31·42
4	0·8830	1 in 3	—3° 41′	28·29

The above samples all represent oils of good quality.

According to Gildemeister and Hoffmann, lavender oils are divided into two classes, those containing at least 36 per cent. of esters and those containing from 30 to 36 per cent. of esters. This classification includes only the finest oils from certain localities. The same authorities say that an oil containing less than 30 per cent. of esters is mostly adulterated. This latter statement is probably too sweeping, because it is well known that oil of lavender is met with that contains as low as 10 per cent. of esters, yet is not adulterated and ranks extremely high in quality.

The method employed for estimating the esters is described in the latter part of the above process for determining santalol, and the chemical reaction is represented by the following equation:

$C_{10}H_{17}O.COCH_3$	+	KOH	=	$C_{10}H_{17}OH$	+	CH_3COOK.
Linalyl acetate	+	potassium hydrate	=	linalool	+	potassium acetate.

The molecular weight of linalyl acetate is 19·6, and the per cent. of ester, x, can readily be calculated by the following formula:

$$x = \frac{19 \cdot 6 \,.\, \frac{y}{2}}{z};$$

y represents the number of cubic centimetres of semi-normal alkali used in saponifying z grammes of oil.

OIL OF THYME.

There appears to be little genuine oil of thyme on the market, but can be obtained if desired. Most of it seems to be adulterated with turpentine. This is especially true of the white, which seldom contains as much as 5 per cent. of phenol bodies. Genuine oil of thyme has been found to possess the following properties: soluble in from 1 to 2 volumes of 80 per cent. alcohol, specific gravity 0·900 to 0·935 at 15° C., and the content of phenol bodies varies from 20 to 30 per cent. Several oils examined of late gave the following results:

No.	Kind.	Specific Gravity at 15° C.	Solubility in 80 Per Cent. Alcohol.	Per Cent. of Phenol Bodies.	Optical Rotation.
1	White	0.877	Insol. in 20 volumes	2·55	—
2	"	0·881	" " 20 "	4·26	—
3	"	0·863	" " 10 "	None	—
4	"	0·8964	Sol. " 2 "	4·	— 3° 48′
5	"	0·8935	Insol. " 10 "	27·	— 3° 48′
6	Red	0·907	Sol. " 2 "	25·56	— 1° 24′
7	"	0·880	Insol. " 10 "	8·73	—
8	"	0·893	" " 10 "	18·81	— 1° 6′
9	"	0·916	Sol. " 1¾ "	30·16	— 2°
10	"	0·9231	Insol. " 10 "	19·00	—
11	"	0.9084	Sol. " 2 "	14·	+ 1° 48′
12	"	0·9074	" " 2 "	24·	— 1° 30′

No. 10 was an extremely muddy looking oil. While attempting to estimate the per cent. of phenol bodies in No. 3, it was noticed that the volume of the oil increased by 2 per cent. rather than decreased. When " white thyme " is called for, almost anything must be expected. The data for Nos. 4 and 5 are so different from any ever examined that strange queries arise in one's mind. No. 5, 27 per cent. phenol bodies, yet insoluble in ten volumes of 80 per cent. alcohol; contrast with this the corresponding data of No. 4, and observe that the gravities and optical rotations are practically the same. How can this be harmonized?

Of the red oils Nos. 6, 8 and 12 can be considered genuine, but 8 and 10 must be rejected with reserve.

The per cent. of phenol bodies was estimated by partially filling a 100 c.c. nitrometer with a 5 per cent. solution of sodium hydrate, then introducing 10 c.c. of the oil to be examined, shaking well for five minutes, and finally setting aside for twenty-four hours. The drops adhering to the nitrometer can be, in part, loosened by rotating or tapping the nitrometer. When the solution has become clear the non-phenol oil can readily be read off and the percentage calculated.

LABORATORY OF

SMITH, KLINE & FRENCH COMPANY.

TECHNIQUE FOR THE RECOGNITION OF CERTAIN ANIMAL PARASITES IN MAN.

By L. Napoleon Boston, M.D.
Bacteriologist to the Philadelphia Hospital, Demonstrator in charge of Clinical Laboratory, Medico-Chirurgical College.

Anchylostoma Duodenale.—The condition produced by this parasite, when present in the intestinal canal of man, is known as brickmakers' disease, or tropical anæmia. Ova of this parasite are found in the feces of infected persons, and their detection is readily accomplished in the following manner: To a small portion of a recently voided stool, sufficient water is added to produce a cloudy liquid, when the stool and water are thoroughly mixed. A portion of the mixture is placed into a test tube and either centrifugated, or allowed to stand for a few hours. A portion of the sediment thus collected at the bottom of the tube is lifted by means of a pipette, and a drop of it placed on the center of a slide, when it is covered by a second slide or a large coverglass. The specimen is now ready for examination and should be studied under a $\frac{2}{3}$ lens, where the ova appear as small, round, opalescent bodies. Individual ova may be studied under a higher power lens—$\frac{1}{5}$ to $\frac{1}{8}$ (*Fig. 1*). These ova are well preserved when mounted in cast medium[1] or in glycerine.

After the administration of certain drugs, the adult worm appears in the feces as a silky, slightly curved thread (*Fig. 1*) whose color is not constant. The parasite's detection is facilitated by adding water to the feces and stirring to effect a perfect mixture which is then poured into a clear glass dish 10 x 12 x 3 inches, which is then set on either a light or dark surface. A thin spread of diluted feces is in this way produced, and affords a favorable field upon which to find the parasite.

The adult worms you see in the small bottle have been preserved in 70 per cent. alcohol. These specimens shown under the microscopes, were first placed in alcohol, and later in glycerin for twenty-four hours, from which they were mounted in cast medium. Glycerine jelly is also a valuable mounting medium for animal parasites.

The anchylostoma is known to be the cause of a large percentage

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[1] Formula for cast medium, Journal, April, 1900.

of deaths occurring in tropical districts, and is of especial interest since Surgeon B. K. Ashford (United States Army[1]) has shown it to be most common in Porto Rico, and other of the West Indies.

Tape Worms.—Segments of these parasites are commonly passed with the stool, and their study and general characteristics differ in no way from where the parasite is expelled as a result of therapeutic measures. The freshly voided segments are first washed in water and then placed in 70 per cent. alcohol for twenty-four hours, when they are transferred to xylol for twenty-four hours and then mounted as follows: A portion of a segment is placed on a slide,

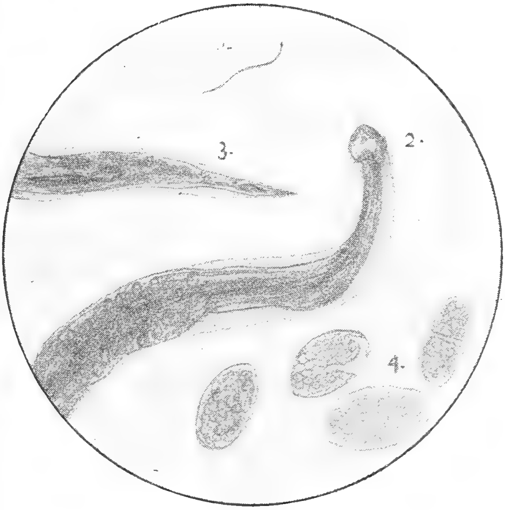

FIG. 1.—Anchylostoma duodenale. (1) Natural size; (2) head and neck (B. L., ⅔); (3) tail (B. L., ⅔); (4) ova (B. L., ⅙).

and teased to shreds. After a short exposure to the air (five minutes) a drop of Canada balsam is added and on it a coverglass placed. Prepared in this manner the ova are readily seen through a ⅔ lens, and when viewed under a ⅙ lens, both their outline and and structure are apparent. Staining is accomplished by Delafield's hæmatoxylin and other dyes, but adds little, if anything, to the specimen's value. Study of the segment in its entirety is most interesting, but scarcely necessary in clinical work. It may be accomplished by placing a segment between two slides and clamping them

[1]*New York Med. Jour.*, April 14, 1900.

tightly together. Under a $\frac{2}{3}$ lens the segment may be studied, showing the uterus stuffed with ova.

To Detect the Head.—This being the portion of the parasite's study wherein most failures are experienced, and to which most importance is attached, I shall consider under the following heads: (1) Empty the bowels, by means of salines, so that no undigested food remains in the alimentary tract; (2) the administration of a vermicide; (3) follow in four to six hours by another saline; (4) when it is observed that the worm is beginning to escape from the rectum,

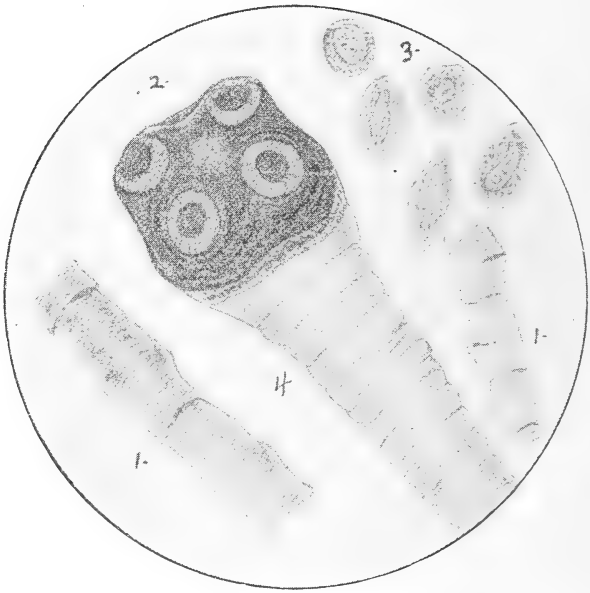

FIG. 2.—Tapeworm. (1) Natural size of segments; (2) head and neck (B. L., $\frac{2}{3}$); (3) ova (B. L., $\frac{1}{6}$).

the patient is directed to occupy a comfortable seat where the worm can pass into a clean vessel containing water; (5) all important is it that the patient sit on one commode from the time he observes that the worm is diminishing in size, until the entire worm is passed; (the nearer the head, the smaller are the segments), when within a few inches, 10 to 12, of the head the worm appears as a pale slightly flattened thread and its segments are not distinct; (6) the head is the last portion of the worm to be passed, and as long as any part of the parasite is protruding from the rectum the probabilities are that the head has not yet escaped.

Given a specimen collected in this manner, add to it a quantity of water, stir gently with a glass rod, after which it will be seen that the worm falls to the bottom of the vessel, when decant one-half, or more, of the liquid, which is replaced by clean water. This washing is repeated until the worm is cleansed. The worm, with the water surrounding it, is now transferred to a clear glass dish 10 x 12 x 3 inches, which is placed on a white surface (towel) and all large segments are removed by a glass rod, drawing them over the edge of the dish, when they are allowed to fall into a second dish containing water; care being taken not to break the parasite.

After all large segments are removed, the head is usually readily detected, by the naked eye, floating amongst the remaining thread-like portions of the parasite. In searching for certain small parasites a hand-glass may be found of service. The head is transferred to 50 per cent. glycerine and preserved for further study. In mounting parasite heads, a slide provided with a concavity of sufficient depth to accommodate their thickest portion, is most satisfactory. They are well preserved when mounted in Farrant's medium, cast medium, glycerine and glycerine jelly (*Fig. 2*).

Tænia Echinococcus (*Dog Tape Worm*).—Here the problem is somewhat different, as man is the intermediary host, and in him develops the head, or scolex of the parasite only. Each head is provided with a crown of hooklets, and many free hooks are often seen in connection with shreds of finely granular, yellowish membrane (*Fig. 3*). Hooklets, scolices and membrane from the cysts of the echinococcus are occasionally found in sputum, pus from abscesses, the fluid of cysts, feces and urine. Hooklets are best studied under a 1/6 lens, while the heads may be detected under a much lower power. It is these findings which enables one to recognize the parasite, and the hooks may be the only evidence present. In the study of this parasite a low power of illumination is necessary, and the skilful manipulation of both Abbe condenser and iris diaphragm afford great assistance. Products of the echinococcus may be mounted in any of the above mounting mediums.

Trichina Spiralis.—The larvæ of this parasite appear in the muscular tissue of man after the ingestion of uncooked, infected pork. They make their appearance early in the diaphragm, frontal, and muscles of the leg. The material to be studied is collected by the

physician in the following manner: The site of incision is over the outer head of the gastrocnemius muscle, and after this area is surgically cleansed the parts are anæsthetized by injecting a solution of cocoaine hydrochlorate. First inject the skin and then the deeper structures down to the sheath of the muscle. When anæsthesia is produced an incision is made dividing all tissues to the muscle's sheath, which is grasped by a rat-tooth forceps and incised, after which a small portion of the muscle is dissected and placed in a vessel containing water. Glycerine and alcohol arrest all movements of the parasite. The wound is now closed and dressed antiseptically. A small piece of this tissue is placed on a slide and teased, by means of fine needles, until most of its fibres appear to be separated. The

FIG. 3.—T. echinococcus. Scolex and hooklets (B. L., 1/6).

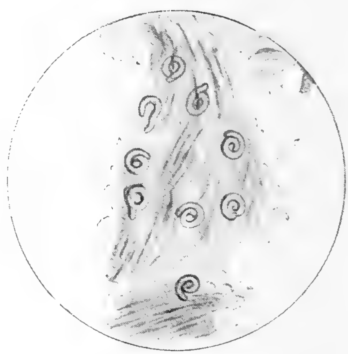

FIG. 4.—Trichina spiralis in muscle from outer head, left gastrocnemius. Twenty-first day of disease (Queen, 2/3).

addition of a few drops of water to the specimen renders the teasing process less difficult. The slide is now viewed under a low power (2/3), and if trichinæ are present their recognition is easy (*Figs. 4* and *5*); however, a very low illumination is required. After a few weeks the trichina become incapsulated by the patient's tissues, when they appear as small solid bodies showing a parasite tightly coiled in their centre. Trichina are also well preserved by any mounting medium containing glycerine.

Distoma Hæmatobia (*Bilharz*).—The adult parasite is probably located in the veins of the bladder, and there deposits its ova which find their way into the bladder or bowel, and appear in the urine or stools. Bilharz's parasite is a common cause of bloody urine in

certain geographical districts. To detect the ova allow the urine to stand until all blood clots are collected at the bottom of the tube; (2) lift a portion of this sediment into a pipette and place a drop on the centre of a slide; (3) tease the clots as fine as possible, and evaporate nearly to dryness; (4) add a drop of cast medium, or glycerine, to the centre of the specimen upon which place a cover-glass and spread the medium by additional pressure. The specimen should be placed on a flat surface for twenty-four hours while the mounting medium hardens, after which time a permanent ring may be added. For rapid diagnosis the specimen may be mounted in water. Detection of these ova is best accomplished by the ⅔ lens (*Fig. 6*). Individual ova may be studied under a higher power, when

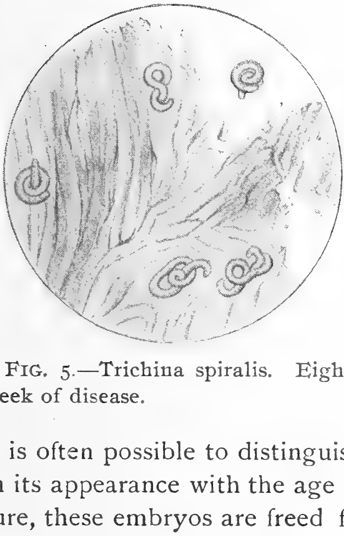

FIG. 5.—Trichina spiralis. Eighth week of disease.

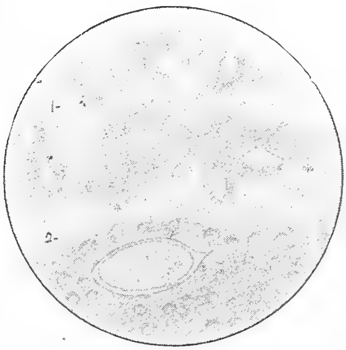

FIG. 6.—Bilharz's parasite. (1) Ova (B. L., ⅔); (2) ova (B. L., ⅙).

it is often possible to distinguish the contained embryo which varies in its appearance with the age of the egg. Influenced by temperature, these embryos are freed from their shell in from a few hours to several days after they are passed with the urine. The most immature ova are about $\frac{1}{400}$ inch in length and $\frac{1}{600}$ inch in breadth, while fully matured ovum measures $\frac{1}{280}$ inch in length and $\frac{1}{325}$ inch in breadth. The study of ova in feces needs no special explanation.

THE VOLATILE OIL OF BUCHU, according to Kondakow and Bachtschiew, consists of (1) a mixture of limonene and dipentene (10 per cent.); (2) menthone (60 per cent.); (3) diosphenol, (20 per cent.); (4) resinous matter, (5 per cent.).—*Ph. Zeit., 1901, 194.*

PHOTOGRAPHIC DEVELOPMENT BY GAS LIGHT.

By William S. Weakley, P.D.

Before entering upon the practical part of this subject, it might be well to first consider the basis upon which we work to obtain certain definite results. These results come about by the chemical action of light rays upon the photographic dry plate, which consists of a glass plate or celluloid (films) coated with a silver bromide gelatin emulsion.

Upon exposure to light the silver bromide particles in the plate are more easily converted by the reducing solution (developer) into metallic silver than those which have not received this exposure. We find that by too long a development, or by using too strong a developer to start with, the unexposed silver bromide is also changed; for this reason development or the reduction of the silver bromide can only be carried on to a certain point.

The next subject to be considered is the use of the developer or reducing agent which brings about this change. These agents may be divided into two classes, namely, slow and rapid; an example of the former class we find in hydrochinone, and of the latter we find in pyrogallol. In using a rapid developer exposures must be correspondingly correct, for if they are not the reducing solution acts too quickly upon the unchanged silver bromide and hence a fog, or as expressed by Professor Nipher,[1] the zero point is approached, if not already reached. With a developer like hydrochinone in its normal alkaline combinations we have a typical slow developer whose rapidity is materially increased by replacing the sodium carbonate by potassium or sodium hydrates. This developer not only enables one by its delay in reducing the silver bromide to judge an over-exposure and remedy it by potassium bromide, but also assists quite materially in stopping the development at the proper time, thus preserving details.

The author of this paper had his attention called to the fact that Prof. Francis E. Nipher, of the University of Washington, was trying to turn our former ideas of the principles of photography upside down, and at the suggestion of Professor Kraemer the substance of Professor Nipher's paper was investigated and some

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[1] "Positive Photography with Special Reference to Eclipse Work." Presented to the Academy of Science of St. Louis, October 15, 1900.

original experiments carried out, with the principles therein laid out as the basis.

We have in the sensitive film, three stages or conditions, namely: the negative, zero, and positive conditions.

With the negative stage our plate is exposed the normal time, which depends upon six things.

(1) On the weather.

(2) On the brightness of object to be taken.

(3) On the time of day and season.

(4) On the amount of light transmitted by the lens used.

(5) On the size of aperture.

(6) On the sensitiveness of the plate.

These six conditions with the dark room fix the basis upon which negative photography is produced, the failure to take any one of these conditions into consideration will mean failure either one way or the other, *i. e.*, undertimed or overtimed; the former condition meaning a thin and contrasting negative, the other a dense and non-contrasting negative or fog; this fog, when perfect, is our zero point, or where the negative merges into the positive condition.

Then an over-exposed negative may be an under-exposed positive, but cannot be an over-exposed positive. This sufficiently overtimed negative or positive must now be developed in the light, so as to carry it farther and farther away from the zero condition; therefore, the nearer the zero condition is approached, the stronger the light must be during development, so as to carry it farther away from this condition.

The application of positive photography is obvious when we consider the liability of over-exposure, especially in such important work as eclipse or microscopic photography; think for a minute of the occurrence of an eclipse which perhaps may not be seen again for centuries, and the application of this new process will be apparent. Its value is inestimable when we consider that the ordinary negative is almost invariably over-exposed for fear that it will be thin and lacking in detail, which condition in a negative is not desired; in fact it becomes all but useless, and were it over-timed and developed as a negative the mere fact that potassium bromide would have to be used in large quantities especially in greatly overtimed plates the corresponding result would be lack of detail, or that condition which was most sought for is destroyed to a greater or less

degree. Any professional or thoughtful amateur photographer will see the application.

In the experiments which were carried out the aperture was set at eight, the lens used was B. and L.'s double rapid rectilinear lens. All exposures made were in bright sunlight, with rapid plates.

After exposure the plate is taken into a room free from daylight and is developed about 8 inches below the mantel of a Welsbach light or between two other strong lights, whether electric, oil or acetylene. The developer should be kept ice cold to obtain the best results. In transferring the plates from the holder to the developing tray it is advisable to remove them in the shadow or better underneath the developing table and quickly transfer them to the developer in the tray.

The plate before entering the developer is of a yellowish color, and if exposed sufficiently shows very faint outlines of the object photographed. This image disappears upon entering the developer and then reappears as a reddish-brown image, gradually turning to the normal grayish-black color of the ordinary negative. These positives can be reduced in the ordinary way with potassium ferricyanide and hyposulphite of soda.

A set of exposures was made as follows:

1	$\frac{1}{50}$ second. Normal exposure for negative.
2	1 minute.
3	3 minutes.
4	4 minutes.
5	30 minutes.
6	60 minutes, 180,000 times normal exposure for negative.

The above were developed with the following formula:

SOLUTION NO. 1.

	Ounces.	Grammes.
Water	25	1,000
Hydrochinone	3	126
Sodium sulphite cryst.	½	21

SOLUTION NO. 2.

	Ounces.	Grammes.
Water	25	1,000
Sodium carbonate cryst.	6	252

Mix the two solutions in equal parts, dilute with three to five times its bulk of water. If a few drops of a 10 per cent. solution of potassium bromide be added it will give brilliancy to the plate but will not assist in improving detail.

The appearance of the above exposures upon development was as follows:

1. Faint image appeared gradually fading and leaving a fog.

2. Image appeared, but upon further development became very slightly foggy.

3, 4, 5 and 6 showed very little difference in density or detail.

LIQUID CARBONIC ACID GAS.

HOW IT IS MADE AND PUT UP FOR SODA FOUNTAIN USE.

By Frederick T. Gordon.

How many druggists are there who know how the liquid gas they are now using for charging their soda water is made, or how it is put into the heavy iron "tanks" in which they have it delivered to them? Now that this liquid gas is rapidly supplanting the old way of making gas in the cellar from various materials or even the buying of soda water already charged, there is every reason why the druggist should know the ins and outs of his supply if he would be able to talk intelligently on it to the inquiring customer. And this is easy to do, too, for the whole operation of making the gas, liquefying it and filling the fountain tanks, is very simple and easily understood.

Liquid carbon dioxide is now as much a matter of commerce as is carbonate of soda, and there are a number of firms in this country making it, from many different materials and in many different ways. The manufacture of the gas may be classed under three general processes: Driving off the CO_2 by heat from various carbonates, such as limestone, dolomite, etc.; this is a process that is confidently stated by authorities to be the one that promises the best returns in the future; formation of the gas by the interaction of acids on carbonates is another, the most common of which are the use of marble and sulphuric acid and bicarbonate of soda and sulphuric acid; while the collection of the gas formed in breweries by fermentation or from burning coke or coal is a process that is rapidly assuming great importance. Considerable CO_2 is now collected from the natural spring waters at different points, the largest manufactory of this kind being at Saratoga Springs, New York.

In this country the collection of gas formed by fermentation in the process of brewing has, as yet, assumed little importance, but when the use of liquid carbon dioxide becomes more general as the motive power of machinery there is little doubt that the valuable by-product now being wasted will be carefully collected by the brewers.[1] The same wilful waste of valuable source of power is also notable in the vast coking industry of this State, thousands of tons of gas going to absolute waste every day in the coke fields, just as in former days tar was considered as not being worth collecting. But when the use of liquid gases as a source of power is made practically possible by improvements in liquid-gas engines we may look to see this "by-product" as carefully and jealously saved as is now the tar from gas works. Another fact to be borne in mind is that when we make use of the gas from combustion, collected and liquefied from the stacks of our factories' countless chimneys, we add to the amount of power possible from coal an economy of material and energy of incalculable amount.

At the present time, the uses of liquid carbon dioxide are chiefly for refrigerating purposes and for charging soda water, so there is not sufficient demand for special inventive genius as yet; indeed, so limited are these uses and so keen the competition that were it not for the "by-products" of manufacture it is possible that the druggist would not yet have this convenient means for making his soda water. The value of these by-products is what makes the cost of liquid gas so small, if it were made and sold simply by itself the cost would be many times greater than it now is. As chemistry makes further strides, we may look for even cheaper gas, as more and more by-products are made use of, the most likely sources being the gas from the burning of limestone to make lime and the collection of the gases of fermentation. The subject of these by-products is too large to be taken up in this short paper, being almost a review of a dozen different industries in itself.

By whatever process it be made, the liquid CO_2 intended for charging soda water must be purified before it is fit for use, there usually being more or less impurities in it that render it unsafe in its crude state. This purification is also of importance in reducing

[1] Large quantities of liquid CO_2 are now imported chiefly from Germany, in tubes holding 200 or 300 pounds. This is collected from breweries there and liquefied for commercial uses and exports.

the cost of liquefaction, a pure dry gas being liquefied with less trouble and cost than a wet impure quality. Usually, the gas is generated in large iron retorts or tanks, when made by chemical action, or in specially made tank-like retorts when made by the action of heat on carbonates; from these it is pumped through coils of pipes surrounded by water through the "purifiers" and "driers" to the first compressor. The "purifiers" are large tanks full of water through which the gas bubbles up just as in the familiar wash-bottle for gases of our laboratories, and is pumped off as it comes through to the "dryer." The best grades of liquid gas are washed four times by being passed through as many separate tanks of water. From the purifiers, the gas is made to pass either through sulphuric acid or over calcium chloride to remove all moisture, this interfering seriously with the compression; in this part of the process there are several trade secrets as to the way and materials used.

After having been washed and dried, the gas, still in its normal state, is pumped to the first compressor, where it is condensed under a pressure of about 200 pounds to the square inch; from this it passes through coils of pipe immersed in a freezing mixture of ice and salt to absorb the heat of compression and comes to the second compressor at a temperature little above 0° Centigrade. The amount of heat generated in the compression of gases is amazing to the unitiated; to absorb it and cool the gas requires a large quantity of ice daily. In the second compressor, the gas is brought to a compression of 540 pounds to the square inch, the pipes of which are also surrounded by a freezing mixture, and passes into a coil of pipe immersed in the same. The gas is still in a gaseous form, but now physical effects begin to play their part and cause it to liquefy by its own expansion. The end of the final coil of pipes is connected directly with the "tank" or cylinder in which the liquid gas is sold to the druggist. The process by which these tanks are filled is extremely interesting and simple.

If you will examine a tube of liquid gas you will see screwed into the top a piece of heavy brass pipe, with a valve for opening or closing the tube at the top (worked by a wrench) and a threaded tube on one side. The pipe connecting with the soda founts is screwed on to this threaded bit of pipe on the side. Inside of this brass pipe, the bore turns at right angles to the bore of the side

opening, at the bottom this bore terminates in a small piece of pipe closed at the bottom and having numerous very minute perforations. The valve by which the tube is opened or closed is a long piece of metal, terminating in a needle-like point, which, when screwed down on the valve seat, closes the opening just below where the side bore issues out. In this arrangement lies the whole secret of the liquefaction of the gas. The gas is let into the tank through the side opening at a pressure of 540 pounds, it escapes inside through the minute openings at the bottom of the bore in the form of a fine spray, and by this sudden expansion lowers the temperature so greatly and rapidly that the incoming gas is at once liquefied and trickles down the sides of the tank. The process is a continuous one, the compressed gas being supplied until the tube is full, shown by the reading of the pressure gauge outside being the same as at the last compressor, 540 pounds, for as fast as the gas is permitted to flow into the tube and escape through the perforated bit of pipe it liquefies itself, the compression being of course kept up at the initial degree. During this process the tubes are surrounded by a freezing mixture to aid in the condensation of the gas by absorbing any heat from compression in the supply pipes.

In some factories, the tanks, tubes or cylinders, all names for the container of the liquid gas, are partially exhausted of air before filling; in others the air is left in, of course making a slight difference in the amount of liquid gas the tube can hold. Another important point to the druggist is the dryness of his liquid gas; very often, especially where the liquid gas is sold at a low figure, the gas is not dried before compression, and there is often a quart or more of water found in every tube filled with wet gas. This freezes as soon as the gas begins to be drawn off and sometimes creates a great deal of trouble by collecting in the exhaust pipe in the form of solid ice, or fine crystals, and blocking up the outlet; hence the druggist should insist upon receiving only liquid gas that has been well dried before it is liquefied, to save annoyance and loss in paying for a pound or two of water and ice at the price of liquid gas.

The ordinary size of tanks contains from twenty to twenty-two pounds of liquid CO_2, but there are other sizes that contain almost double the amount. The old style tank was made of cast steel and could sustain a pressure of 3700 pounds to the square inch; the newer tanks are made of a mild steel that can stand a pressure of

15,000 pounds. When the tanks are taken out of the freezing mixture and come to the temperature of surrounding air, the pressure of the gas inside is about 900 pounds to the inch in winter and 1100 in summer, and there is also a varying development of pressure inside when the gas is being drawn off for use. Under almost all circumstances, these tubes of liquid gas are perfectly safe to handle and will stand a great amount of jolting, yet there are conditions when the critical temperature of the liquid gas is passed and it assumes the gaseous form inside the tube, and then a seemingly slight cause or weakness in the steel will cause a disastrous explosion. It is well to be on the safe side and to handle these tubes carefully and not to open the valve too suddenly, a gradual opening until the pressure gauge stands at the desired pressure being safest. The small size cylinders are about 3/8 to 1/2 an inch in thickness of their steel walls and weigh, when filled, from fifty to seventy pounds.

It is of course understood that the process I have just mentioned is the particular one used in the Philadelphia plant I visited; there are other methods, of later date, by which greater economy of time and material are achieved, the method of the Liquid Gas Company, for instance; but the essential principle is the same, the escape of CO_2 from fine orifices under pressure. In this plant I mention, an average of 15 horse-power working for 10 hours produces from fifty to eighty tubes full of liquid gas, according to the speed with which the compressors are run. These figures will differ greatly from those of more modern plants.

It must be borne in mind, when considering these figures, that when the gas is brought under a pressure of 540 pounds at 0° Centigrade and allowed to flow into the cylinders through the specially devised arrangement described above that it in great part liquefies itself by its expansion.

This, of course, is because the gas escaping suddenly from a great pressure to that of the atmosphere requires a great deal of heat in its expansion and this heat it takes from the gas immediately following it, thus bringing the temperature down low enough to cause its liquefaction under the pressure it is sustaining. This principle is now widely used in the liquefaction of all gases, such as air, hydrogen, etc., it being practicable to liquefy air by allowing it to escape from minute openings under high pressure into the open atmosphere.

The process whereby the water in the founts is charged with the gas is too familiar to the druggist to be of interest here, so this article will be concluded with the advice to the druggist to discard his old style marble-dust generators as soon as he can and use the cleaner, surer and more economical liquid carbon dioxide and get the most sparkling pungent soda water through his draught tubes.

CORRESPONDENCE.

PROCTER MEMORIAL.[1]

In response to a letter from the editor of this JOURNAL concerning the feasibility of establishing a research laboratory as a memorial to the life and work of Professor William Procter, Jr., by the American Pharmaceutical Association at its semi-centennial in 1902, the following are some of the replies which have been received:

DEAR SIR:—I am very glad to see that the proposed establishment of a research laboratory upon the fiftieth anniversary of the A.Ph.A. is finding more and more favor. When I wrote you some months ago I should not have had the courage to advocate so much of an undertaking, but now I should like to have a good effort made for it.

ANN ARBOR, MICH. A. B. PRESCOTT.

DEAR SIR:—I earnestly favor the establishing of a research laboratory by the American Pharmaceutical Association. No better step could possibly be taken. There can be but very little progress for pharmacy except through the laboratory, and for the representative pharmaceutical association of the United States to recognize this fact and act accordingly would be to the profit and honor of the association and the profession of pharmacy. I hope the matter will be brought forward in a practical shape at St. Louis and wisely passed on.

INDIANAPOLIS, IND. J. N. HURTY.

DEAR SIR:—I am just in receipt of yours of the 1st ult., in reference to the establishment of a research laboratory. I do not know that I can add anything in regard to this matter beyond what

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[1] For editorials and other correspondence on this subject, see this JOURNAL, November, 1900, and February, March and April, 1901.

was given in the Report on the Revision of the U.S.P. at the 1898 meeting.[1] This covers it all, and I have had no reason to change my mind. It would certainly be of great value to all interested branches if such a thing could be brought about. And possibly, if sufficient funds could be had to establish such a laboratory, means could be obtained by a system of charges, fees and published information to those who contributed to its establishment to maintain it.

The establishment of such a laboratory would go far in placing pharmacy on the road to that higher plane we are striving for.

It would seem to me that by a united effort on part of the A.Ph.A., sufficient pressure could be brought to bear on Congress to aid in its establishment.

SOUTH BEND, IND. LEO ELIEL.

DEAR SIR:—Absence must be my excuse for not promptly answering yours of the 4th, respecting the establishment by the A.Ph.A., of a research laboratory as a memorial to the late Professor Procter.

To properly equip, build and endow such an institution would, in my judgment, require about two hundred thousand dollars ($200,000) —say building and ground, $25,000, apparatus and furniture, including books, $5,000, leaving $170,000 to be invested at 3 per cent., yielding an annual income of $5,100. I do not believe anything approaching this sum can be obtained.

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[1] In the Report of the Committee on Revision of the U.S.P. of the A.Ph.A., it is stated that:

"Your Committee further recommends the establishment of a scientific laboratory, employing chemists and pharmacologists by the year, to carry on investigations on the lines indicated by the National Committee. Such a laboratory would be of great benefit to the pharmacists and physicians of this country, as well as a great credit.

"It is the opinion of this Committee that a laboratory with all the modern equipments on a fairly large scale should be established at Washington, where the assistance of the Government chemists, library and facilities could be had; such laboratory to have facilities for the working of four or more chemists under the guidance of one of them as director, and for the working of one pharmacologist, who should have a separate but adjoining room to the chemical laboratory, and work conjointly with them under the guidance of the general director. If the Revision Committee has not sufficient money at its disposal and cannot obtain it, no doubt the pharmacists and manufacturing establishments of the country will make up the deficiency."—[See Proc. A.Ph.A., 1898, p. 225.—ED.]

In considering this question, a proper regard should be had for the reputation of American pharmacy, as well as the honor of Professor Procter.

Whatever is undertaken should be clearly within the limits of our ability to do well and thus reflect credit on pharmacy while honoring one of its patrons. The disgrace which would attend failure in such an effort would be intensified rather than assuaged by ascertaining when too late, that our endeavors were aimed too high.

My suggestion, if one is permitted, would be to appoint the strongest committee possible; embracing all phases of pharmacy, and give this committee full power, first to solicit subscriptions and second, afterwards to decide on the character of the memorial.

WASHINGTON, D. C. W. S. THOMPSON.

PHARMACY LAWS AND LEGISLATION.

CONTRIBUTED BY PROF. J. H. BEAL, SCIO, O.

(Under this title it is designed to give each month a brief *résumé* of proposed and accomplished pharmacy legislation, and of decisions of importance to pharmacy boards and pharmacists. On account of space limitations, proposed legislation cannot be more than briefly mentioned, but bills enacted into law will be discussed and their principal features pointed out. Pharmacy boards and members of legislative committees and others are requested to send copies of such measures and news of this kind either to the editor of this JOURNAL, or to Prof. J. H. Beal, Scio, O.)

The flood of proposed pharmacy legislation still continues; the state legislature that has not at least two or three pharmacy bills pending is decidedly out of fashion.

NEW YORK.

New York still continues to be the storm centre of proposed pharmacy legislation. Among the measures which have not been previously reported in these columns, are the following:

As a result of the disastrous explosion in the drug warehouse of Tarrant & Co., of some months ago, a bill has been introduced into the Assembly to amend the present law regulating the storage of explosives. The measure was prepared by a committee of the drug section of the Board of Trade and Transportation, and prohibits the storage of the substances specified in any building part

of which is used for dwelling purposes, or in excess of the amounts specified, except in such places and in such manner as may be prescribed by the Fire Commissioner.

The Thornton Bill which strikes out the annual registration feature of the present law has passed the Senate, and is now in the lower branch of the legislature.

The Smith Bill, introduced by Assemblyman Smith, would permit druggists to register without examination on making affidavit of three years' experience.

The bill introduced by Senator Malby proposes to exempt pharmacists of the various state institutions from the provisions of the pharmacy law, probably on the ground that public office being a private snap, such a little thing as ignorance of one's duties should not be permitted to interfere with political appointments.

From the *Pharmaceutical Era* we copy the following: "A Buffalo man claims to have discovered a wonderful remedy for rheumatism, and in virtue of this discovery he feels that he should be entitled by law to practise medicine without passing the regular medical examination and fulfilling the other requirements laid down, and he has induced a State Assemblyman to introduce a bill for his relief in this respect. Another bill, which has been killed, however, was to permit an individual to practise veterinary surgery without fulfilling the requirements demanded by law."

The Costello Bill has been amended so as to deprive it of some of its more offensive features by the addition of the following new matter: "The Secretary of any division of the State Board of Pharmacy, having within his territory any such village or place, shall, whenever the necessity therefor is shown to exist, grant to some resident therein, who has had experience in dealing in drugs, medicines and poisons, a permit to compound medicines, fill prescriptions and sell poisons for a period not exceeding one year, and on payment of a fee not exceeding $300. Such permit shall be limited to the village or place in which such person resides, and may be limited to one or more of certain kinds or classes of poisons." The places or villages referred to are not to exceed 1,000 in population.

A notable bill, introduced by Assemblyman Morgan, provides that apprentices within one year of the beginning of their apprenticeship, shall appear before the Board and submit to an examina-

tion which shall show mental fitness equivalent to thirty-six counts chosen by the Board of Pharmacy from those required by the regents of the University of the State of New York from students in law, medicine and dentistry. Certificate of good character is also required.

Graduates of high schools, academies, colleges of pharmacy or other institutions recognized by the Board are to be registered as apprentices without examination. The fee for the apprentice's certificate is fixed at 50 cents.

ARKANSAS.

The manufacturers of alum baking powders who have been so thoroughly chevied by the cream of tartar people, are alleged to be resposible for the following bill which has been introduced into the legislature of the State of Arkansas: "Whereas, bitartrate of potash (cream of tartar) as used in combination with bicarbonate of soda for aerating or leavening or preparing farinaceous foods, does, by its chemical reaction, leave in such foods 9 per cent. tartrate of potash and soda (commercial strength) in combination or in such quantities as is believed to impair and undermine the health of many people who use it; therefore,

Be it enacted, etc., that the chemical known as bitartrate of potash (cream of tartar) shall not be sold or offered for sale either in combination with bicarbonate of soda or separately, for the purpose of aerating, leavening or preparing farinaceous foods, or used by venders of food products for aerating, leavening or preparing such food products."

The penalty for violation is fixed at $500 and six months imprisonment.

ILLINOIS.

The bill proprosed by the Committee on Legislation, amending the pharmacy law, has been introduced into the House of Representatives by Mr. Purdunn. The principal features of the bill are the provisions making examination fees non-returnable in case of failure, the prohibition of adulterations, and the appropriation of $10,000 for the expenses of the board.

Other bills are as follows:

A bill requiring proprietary medicines to be labelled with the formula of their constituents.

The Mueller Bill prohibiting the use of injurious substances in food preparations.

The Galligan Bill amending the present label law.

The Hunt Bill regulating the working hours of drug clerks in cities of 500,000 or more inhabitants.

The Helminiak Bill regulating the sale of baking powders.

PENNSYLVANIA.

The pharmacy bill in Pennsylvania has been defeated by the decisive vote of 155 to 12, its defeat being due almost entirely to dissensions among the druggists of the State.

It is also reported that a bill has been enacted which does away with the triennial registration feature of the old law, and also with the requirement of exposure of the certificate of registration. This is regrettable if true, as experience has amply demonstrated the fact that a pharmacy law is next to unenforceable without these provisions.

MASSACHUSETTS.

The Cook Bill, mentioned in the April number, and which sought to increase the liquor license of druggists from $1.00 to $500, has been defeated.

A petition has been presented to the legislature of the State for a law to permit all druggists who were entitled to registration at the time of the passage of the original pharmacy act to register as drug sellers, but not to compound prescriptions, without examination.

It is to be hoped that no such vicious measure will ever be permitted to become law. If the men for whose interest it is intended were too careless to register when they had the opportunity, and are still too ignorant to pass an examination in pharmacy, they are certainly too careless or too ignorant to be safe dispensers of drugs and medicines.

MAINE.

A bill has been introduced into the Maine Legislature granting druggists the right to sell liquors for medicinal, chemical and mechanical purposes, with certain restrictions designed to prevent an improper use of the privilege.

MICHIGAN.

A bill to prevent the improper sale of liquors by druggists, and providing for an assistant Secretary of the Board of Pharmacy, has passed the Senate.

MISSOURI.

The measure amending the Missouri Pharmacy Law so as to prevent the registration of physicians as pharmacists without examination has been made law.

The amendment, for a copy of which we are indebted to Dr. H. M. Whelpley, is as follows :

SECTION I. Section 3037 of chapter 23 of the Revised Statutes of 1899, relating to druggists and their licenses, is hereby amended by striking out the words " *Provided*, that nothing in this chapter shall be construed to require any physician duly authorized to practise medicine in this State to submit to an examination as a condition precedent to a license as a pharmacist, but that the same shall be issued upon presentation of his diploma as a physician," so that the said section, as so amended, shall read as follows:

SEC. 3037. It shall be unlawful for the proprietor of any store or pharmacy to allow any person, except a registered pharmacist, to compound or dispense the prescriptions of physicians, or to retail or dispense poisons for medical use, except as an aid to or under the supervision of a registered pharmacist. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be liable to a fine of not less than $25 nor more than $100 for each and every offense."

It is regrettable that the pharmacists of Missouri did not make use of this opportunity to procure the enactment of the form of law approved last year by the American Pharmaceutical Association.

The following, known as the Griffin Bill, has, according to the *National Druggist*, from which we copy, been introduced into the Missouri Legislature.

SEC. 3018a. In all prosecutions, either upon indictment or information, for the sale of intoxicating liquor under what is known as the dramshop act, and in all prosecutions for the sale of intoxicating liquor without license, it shall be sufficient for the State to show the sale of such intoxicating liquor, and *if the defendant*

admits such sale, it shall devolve upon him to show that he sold such intoxicating liquor legally; and it shall be no defense for the defendant to show that he was doing business under a merchant's license, or that he was *a registered pharmacist, a druggist, or the proprietor of a drug store, unless he shall show that such sale*, if made, *was made in conformity to the provisions of the law concerning merchants or druggists.*

As a druggist would necessarily admit a legal sale of liquor, he would stand *prima facie* convicted of crime under this section, and would be open to endless blackmail and persecution if it should become a law.

MINNESOTA.

The Hillmond Bill, which has the support of the prohibition interests, makes it a misdemeanor for a physician to prescribe more than two "apothecary ounces" of distilled, vinous, or malt liquors for any one person in any one day. If this should become a law, its effect would be to render illegal the use of alcoholic liquors in the class of cases in which they are of most benefit, while it would have little or no effect upon the improper use of liquor by those who are determined to possess it.

TENNESSEE.

The following curiosity, known as the Wickham Bill, has been introduced into the legislature of the State of Tennessee:

"SECTION I. Be it enacted by the General Assembly of the State of Tennessee, that it shall be a misdemeanor for any person or persons to sell or give away within the State of Tennessee, any morphine or any preparation or mixtures containing the active property or principle of morphine, except on the written prescription of a practising physician, and said prescription is not to be refilled, except at the instance of the physician giving the prescription, who shall give written permission to the party to whom prescription was given, to have same refilled; provided, that nothing in this act shall apply to the wholesale dealer in supplying the retail dealer, or to the retail dealer who may sell to practising physician.

SEC. 2. Be it further enacted, that any person or persons violating the provisions of this act shall be deemed guilty of a misdemeanor, and on conviction shall be fined not less than $10, nor more than $500, and imprisoned in the county jail where the person

or persons reside at the time of commission of said offense, not less than thirty days nor more than ninety days imprisonment, only in the discretion of the court.

The expression, "active property or principle of morphine," and in the 2d Section," imprisoned in the county jail where the person or persons reside at the time of commission of said offence," are excellent examples of the use of language to conceal thought, and are samples of the careless phraseology in many of the existing pharmacy laws.

Decisions of Interest to Pharmacists.

LAWFULNESS OF COMBINATIONS TO MAINTAIN PRICES SUSTAINED.

The suit of the Los Angeles, California, cutters against the Retailers' Association and the jobbers of that city, for $50,000 damages received because of an alleged unlawful combination to prevent the plaintiffs from procuring goods, has been decided in favor of the defendants. The court in its opinion follows the line of recent decisions and maintains the principle that the producers or sellers of an article have the right to fix the price at which the same may be sold, and to refuse to supply the same to others who will not agree to maintain such prices.

RESPONSIBILITY OF DRUGGISTS FOR POISONOUS PRESCRIPTIONS.

A recent police court decision at Cleveland, Ohio, is of interest to pharmacists.

The case was as follows: A physician gave a druggist's clerk a verbal prescription to put up a certain quantity of tincture of aconite, to be labeled "ten drops in a glass of water and then a teaspoonful every hour," which was done. The mother of the child gave it first the ten drops in a glass of water, and an hour later a teaspoonful of the pure tincture, resulting of course in the death of the patient. The clerk who put up the prescription was arrested under the law given below.

The Ohio label law, divested of superfluous verbiage, declares that when any dealer shall sell any drug or medicine an indiscriminate or careless use of which would be destructive to human life, he shall affix to each bottle or package a label in red ink, bearing the name of the drug, skull and cross bones, the words caution and poison, and the names of at least two of the most readily obtainable

effective antidotes. It contains no clause exempting physicians' prescriptions from the law.

Judge Fiedler, before whom the hearing was had, decided in favor of the defendant, the following being the salient points of his decision :

"The relation between the druggist and his customer is two-fold :

"(1) When he sells an article purely and simply, where his professional skill is not brought into account, as, for example, where a customer purchases 15 cents worth of tincture of aconite. In this case we have a purely commercial transaction, that is, a sale, and Section 4354–64 applies.

"(2) Where a customer brings a prescription, or, as in our case, the prescription is left by the physician, and the customer calls for the medicines, a different relation exists between the parties in this latter case. There are the three parties necessary, the physician, druggist and purchaser. The physician examines his patient and decides what shall be used—the patient has no choice in the matter whatever—he takes what is given him. He relies upon the skill of the physician, and, having received his prescription, he relies upon the druggist to follow the directions therein set forth. He must have confidence in the ability of each of them, that of the physician to diagnose the case and that of the druggist to execute the directions of the physician in compounding and dispensing the drugs, chemicals and poisons into a medicine. When once compounded or dispensed, these drugs, chemicals and poisons lose their identity. They are not so much aconite, morphine, alcohol, water or whatever the ingredients may be ; it is a medicine and nothing but a medicine.

"The physician must be the best judge of the proper remedy and must know how that remedy should be applied. He directs the druggist what to use and in what proportions, and he tells him just how that compound should be used. It is an extremely delicate and dangerous operation, and any variation, even in the slightest degree, from the directions so given, may, and in most cases of dangerous illness undoubtedly would, prove fatal. In the case before us it did prove fatal. For the performance of this service the druggist charges as any other professional. This is no more a sale of that medicine, as the law contemplates a sale, than it is a sale when a lawyer charges his client for writing a letter or a contract. His

charge is not for the paper or material used, but for his professional services.

"Technical words, when used in referring to a technical subject, are to be given the meaning which they have when applied to the particular art or science with reference to which they are used, *i. e.*, their technical meaning. So an act relating to commerce is interpreted according to the vocabulary of merchants, and it naturally follows that an act relating to druggists and physicians must be interpreted according to their vocabulary. (23 Ency. of Law, 324.)

"In the vocabulary of druggists this was clearly not a sale, but was a dispensing, and when a medicine is composed of several ingredients it is a compounding.

"In the opinion of the court this was not a sale of any drug or chemical or poison within the meaning of Section 4354–64, and the defendant is accordingly discharged."

As some higher courts have construed the subject differently in similar cases, it will be the part of wisdom of Ohio pharmacists to see that at the next session of the Legislature the poison statute is amended so as to remove all chance for ambiguity.

PRACTICE OF MEDICINE DEFINED.

The Council of the Ontario Medical Society employed an informer to detect cases of counter prescribing, and on the evidence thus procured brought cases against several druggists, one of them being King *vs.* Lee and others. The magistrate deciding against the defendants, an appeal was taken before Judge McDougall, who reversed the magistrate's decision with costs upon the prosecution. The main points of Judge McDougall's opinion are as follows:

"The conviction only sets out one *act as occurring on a named day.* I have already discussed very fully in Reg. *vs.* Whalen (not reported) what must be shown to amount to a practising of medicine. The single *act of prescribing medicine to one person on one day will not amount to a practising of medicine.* The conviction charges that the defendant, on the date named in the conviction, prescribed for Minnie Warring and others contrary, etc. Upon looking *at the testimony there is no evidence of the defendant on that day or at any prior date having prescribed for any one.* Evidence *of acts of practising* antecedent to the date named in the conviction might, no doubt, be given to *establish a practising*, and possibly evidence of acts of prac-

tising subsequent to the date laid in the conviction but before the date of the information, might be given as establishing or tending to establish a practising of medicine. These acts, however, must be sufficiently proximate in point of time to afford evidence of practising rather than tending to establish the commission of a separate offence. (Apothecaries *vs.* Jones, I. Q. B. D., 893).

Under the case of Reg. *vs.* Spain, 19 Ont., 315, and the cases therein cited, it has been held that it is necessary that the conviction should set out the particular act or acts by the defendant which constitute the practising. The present convictions do not do so, and in this particular they are therefore defective."—*Canadian Pharmaceutical Journal.*

PHARMACEUTICAL MEETING.

The seventh of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1900–1901 was held Tuesday, April 16, 1901. Mr. James T. Shinn, a well-known member of the College, presided. The meeting was different in one or two particulars from the majority of meetings, and as interesting as any that have been held this year.

The first speaker was Dr. L. Napoleon Boston, a well-known bacteriologist and physician in Philadelphia, who read an interesting paper on "Technique for the Recognition of Certain Animal Parasites in Man" (see page 228). In connection with this paper the speaker exhibited a number of microscopic slides of these parasites in different stages of development. Professor Lowe said that the paper of Dr. Boston was of practical importance, and in commenting upon the subject of tape worms said, that he had given some attention to their removal and that he believed that the tænifuge was not so important as the manner of treatment.

In view of the interest that has been aroused in the subject of expert testimony by Professor Lloyd's treatment of the strychnine test with sulphuric acid and bichromate of potassium, Mr. Kebler read a paper on "An Examination of the Chemical Tests for Strychnine." The speaker gave a brief review of the general methods for recovering the alkaloids from organic mixtures. In reference to color reactions, he said that these were influenced by the

concentration and purity of the substance, and that they served simply as useful guides to be considered in connection with other properties. Where the substance occurs in sufficient quantity to be crystallized, the speaker considered the microscopical examination one of the most reliable of tests for establishing its identity.

Mr. Freeman P. Stroup, Instructor in Chemistry in the College, made, at the request of Professor Kraemer, an examination of some powders which were submitted him by Professor Lloyd, the composition of which was as follows, although this composition was not known at the time the tests were made, with the exception of No. 1: (1) Mixture of hydrastine, 1 part, and morphine, 9 parts. (2) Mixture of No. 1, plus 10 per cent. of strychnine. (3) Mixture of hydrastine, 1 part, and morphine, 9 parts. (4) Mixture of No. 1, plus 25 per cent. of strychnine. (5) Mixture of No. 1, plus 50 per cent. of strychnine. (6) Mixture of No. 1, plus 10 per cent. of strychnine. (7) Mixture of No. 1, plus 25 per cent. of strychnine.

The tests were carried out on crucible lids, and, as nearly as possible, under the same conditions, and a sample of pure strychnine was tested under the same conditions in order to note similarities or differences in behavior.

In each case eight drops C. P. sulphuric acid (sp. gr. 1·84), weighing approximately ·230 grammes, was placed upon crucible lid, and to it was added a small portion (·010 to ·012 grammes) of the powder to be tested, and stirred around with a glass rod until dissolved. A fragment of potassium bichromate size of pin head (about ·006 gramme) was then dropped in and moved about with glass rod. In the case of the strychnine a violet-blue streak followed the bichromate, whether the crystal was moved rapidly or slowly, but the color was transient, changing in one or two seconds to yellow or orange.

In the case of all the others, if the crystal was moved rapidly the streak was greenish-yellow, changing rapidly to purplish-violet, while a slow tracing with the crystal produced the purplish-violet streak at once. The shades produced were not strictly identical, but so nearly alike that a description could not be given that would give a definite idea of their differences. No. 3 and No. 4 had a sort of blue-grayish cast, and No. 1 gave the deepest shade, being practically a purple. In the case of No. 5 the purplish color disappeared after about an hour, and thereafter the moving of the

crystal showed the same color effects as was shown in the test for pure strychnine.

After four hours three or four drops of sulphuric acid and a somewhat larger crystal of bichromate were added to each test, producing after a time a gradual change of the purplish colors of Nos. 2, 3, 4, 6 and 7 to violet brown in the case of Nos. 2, 3 and 4, and light green in the case of Nos. 6 and 7; but in none of these five cases could any indication of the presence of strychnine, either by streak or after-color, be detected. Mr. Stroup also tested these powders before the audience at the close of the meeting.

Prof. F. X. Moerk spoke of the influence of one alkaloidal body upon another and as interfering in giving definite characteristic reaction. He spoke of the use of solvents as in Dragendorff's scheme for separating the alkaloids and showed how it could be applied in the examination of the above powders. He also referred to the old acid color tests for the identification of fixed oils and said that owing to the recent improvements of the oils the bodies which had given these reactions were removed and therefore color tests were now considered to be of less value. The last of these to be abandoned was the test for oil of sesame with hydrochloric acid and sugar. On the whole it was the opinion of Professor Moerk that these tests are valuable so far as they go, but that all other tests must be used.

Mr. Beringer spoke of the difficulties in the examination of post-mortem material, and referred to the influence of ptomaines in modifying color reactions as many of these closely simulate the alkaloids and other substances. In nearly all cases of this kind Mayer's reagent will give a reaction, but the substance cannot be isolated on account of the smallness of the quantity present. He mentioned the following alkaloids as being closely simulated by ptomaines: Colchicine, atropine, strychnine, etc. He spoke of a musty sample of corn-meal which yielded a ptomaine giving the reaction and physiological symptoms of strychnine. This body was subsequently broken up into a body resembling nicotine and another one like strychnine.

F. T. Gordon referred to a post-mortem case in which what was supposed to be six or seven grains of strychnine were isolated, but which was found upon investigation to be a ptomaine. He thought that an important point had been overlooked in this controversy, and that was if we did not know the composition of the

mixture (Lloyd's) would we not be inclined to look upon it as being strychnine.

In commenting upon the use of the microscope in the examination of substances in small quantities, Professor Kraemer said that as a result of experiments which he had carried out there were certain difficulties in the work which prevented the uniform crystallizing of the same substance. He had found that on crystallizing solutions of alum in watch crystals the crystals separate in three or four different forms apparently of the same system, although he thought that even the system of crystallization might be different but had not investigated this point as yet. It is well known that calcium oxalate occurs in the monoclinic and tetragonal system. In other words, microscopic physical conditions must be taken into account in work of this kind.

William S. Weakley, Instructor in Botany and Pharmacognosy in the College, gave a paper and demonstration on "Photographic Development by Gas Light." (See page 234).

Frederick T. Gordon read a paper on "Liquid Carbonic Acid Gas." (See page 237).

Mr. Stedem exhibited a device made by Dr. William P. Grady for making the cold contact nitric acid test for albumin. H. K.

THE PHILADELPHIA COLLEGE OF PHARMACY.

EIGHTIETH ANNUAL COMMENCEMENT.

The exercises connected with conferring the degrees of Doctor of Pharmacy and Pharmaceutical Chemist were held in the Academy of Music, Wednesday evening, April 17th. Prayer was offered by Rev. Kerr Boyce Tupper. The degrees were conferred by the President, Howard B. French. The following received the degree of Doctor of Pharmacy:

Name.	*Subject of Thesis.*	*State.*
Alden, Harley Roscoe,	*Assay of Spiritus Ætheris Nitrosi,*	Maine.
Anstock, Arthur David,	*Substitution in Pharmacopœial Formulæ,*	Pennsylvania.
Barnett, Eldridge Ewing,	*Liquor Potassii Arsenitis, U.S.P.,*	New Jersey.
Bell, Robert Nevens,	*Keratinized and other Enteric Pills,*	Nebraska.
Benner, Frederick James,	*Russian and American Pharmacy,*	Pennsylvania.
Boesch, Theodore Karl,	*Ancient History of Pharmacy,*	Pennsylvania.
Boltz, Paul Kline,	*Pharmacology of Jaborandi,*	Pennsylvania.
Borrowes, George Henry,	*Pharmacy,*	Pennsylvania.
Boyson, Theophilus H., Jr.,	*Digitalis,*	New Jersey.

Name.	*Subject of Thesis.*	*State.*
Branin, Manlif Lewis,	*Cochineal,*	New Jersey.
Brenner, Frederick Arthur,	*Synthetic Remedies,*	Pennsylvania.
Cather, Frank Leslie,	*Disguising the Taste of Castor Oil,*	Pennsylvania.
Collins, Lane Verlenden,	*Nickel,*	New Jersey.
Cone, Earl Hobart,	*Bottled Ammonia,*	New York.
Converse, Howard Romaino,	*Strophanthus,*	Pennsylvania.
Davis, William Brown,	*Pimpinella Anisum,*	Pennsylvania.
Doan, Chester Clayton,	*Oleum Ricini,*	Pennsylvania.
Dunn, Edwin Alfred,	*Magnesium Carbonate,*	Pennsylvania.
Eckels, Paul,	*Nicotiana Tabacum,*	Illinois.
Eddy, Roswell Martin,	*Spiritus Ætheris Nitrosi,*	Pennsylvania.
Eppler, George Theodore,	*Sodii Chloridum,*	Pennsylvania.
Fegley, Florence Augusta,	*Official Medicinal Plants of Lehigh County,*	Pennsylvania.
Fegley, John Stauffer,	*Oleum Morrhuæ,*	Pennsylvania.
Fischer, Adolph Gustave,	*Tincture of Ferric Chloride,*	Pennsylvania.
Fisher, George Calvin,	*Substantial Powder Folder,*	Pennsylvania.
Fleming, Samuel Clarkson,	*Eriodictyon,*	Pennsylvania.
French, Rolland Hall,	*Seidlitz Powders,*	Ohio.
Garber, Elmer F. Weaver,	*Cultivation of Tobacco,*	Pennsylvania.
Goodyear, Harry Jacob,	*An Antidote to Gelsemium Sempervirens,*	Pennsylvania.
Gruel, John Edward,	*Gelatin Capsules,*	Pennsylvania.
Harris, William K. Garfield,	*Thymol Iodide,*	Pennsylvania.
Harbord, Kittie Walker,	*Berberis Aquifolium,*	Oregon.
Hassinger, Samuel Reed,	*Analysis of one thousand Prescriptions,*	Pennsylvania.
Haydock, Mabelle,	*The Bacteriological Examination of some Clinical Thermometers,*	Pennsylvania.
Highfield, Herbert Monroe,	*Potassa et Calx Sulphurata,*	Ohio.
Hill, George Price,	*Atropa Belladonna,*	Pennsylvania.
Hires, Lewis Moore,	*Vaccine Virus,*	New Jersey.
Hoffert, Charles Edward,	*Milk Sugar and its uses in Pharmacy,*	Pennsylvania.
Hoffman, Ira Calvin,	*Maple Sugar,*	Pennsylvania.
Houston, Franklin Paxson,	*Antitoxin,*	Pennsylvania.
Hubler, Guy Garfield,	*Phosphorus,*	Pennsylvania.
Jetton, James Stuart,	*Ginseng,*	Tennessee.
Klopp, Edward Jonathan,	*Refined Cocoanut Oil,*	Pennsylvania.
Knerr, Charles George,	*Potassii Nitras*	Pennsylvania.
Kraus, Otto Louis,	*Coal Tar,*	Connecticut.
Lacy, Burdett Seldon,	*Manaca,*	Pennsylvania.
Leib, Wilbur John,	*Glonoinum,*	Pennsylvania.
Lewis, Fielding Otis,	*Tecoma Radicans,*	Kentucky.
Liebert, Louis Williams,	*Rhamnus Purshiana,*	Pennsylvania.
Luddy, James Darrah,	*Rhus Toxicodendron,*	Pennsylvania.
Luebert, Frederick George,	*The Examination of Commercial Hypochlorites,*	Pennsylvania.

Name.	*Subject of Thesis.*	*State.*
McClurg, Benjamin Hoffer,	*Emulsions,*	Pennsylvania.
McDermott, Robert Joseph,	*Borax,*	Pennsylvania.
MacFadden, Warren Lester,	*A Resin-free Syrup of Senna,*	Pennsylvania.
Macphee, John James,	*Gossypium Herbaceum,*	Nova Scotia.
Mauger, Harry Fillman,	*Liquor Magnesii Citratis,*	Pennsylvania.
Michels, Victor Clyde,	*Loss of Moisture in Inorganic Salts,*	Illinois.
Murphey, Edwin Mason,	*The U. S. P. Products of the Pine,*	Mississippi.
Musser, Guy Musselman,	*The Modification of Milk as of interest to Pharmacists,*	Pennsylvania.
Nauss, George Hill,	*Acacia,*	Pennsylvania.
Picking, Jacob Sylvester, Jr.	*Elixir Ferri Pyrophosphatis Quininæ et Strychninæ,*	Pennsylvania.
Pflieger, Adam William,	*Filocarpus Pennatifolius,*	Pennsylvania.
Post, Arthur Edward,	*Tinctura Opii Deodorati (with Paraffin)*	Pennsylvania.
Pursel, Robert Clayton,	*Sanguinaria,*	Pennsylvania.
Raser, William Heyl,	*Tr. Opii Deodorati (by Benzin)*	Pennsylvania.
Reynolds, Clarence Hyatt,	*N. A. Hemlock and Tanning Process,*	Pennsylvania.
Rhoads, Luther K.,	*Asafœtida,*	Pennsylvania.
Rinker, William,	*Rhamnus Purshiana,*	Pennsylvania.
Roberts, George William,	*Copaifera Officinalis,*	Pennsylvania.
Rogers, Walter Clyde,	*Relation of Physician and Druggist,*	Pennsylvania.
St. Jacques, Gaston,	*Tinctures of B. P. and U. S. P.,*	Canada.
Saul, Irvin Ellsworth,	*Unguentum Aquæ Rosæ,*	Pennsylvania.
Schmerker, Adolph A. Beyer,	*Tincture of Myrrh*	Pennsylvania.
Schneider, Emil Sebastian,	*Tannin and its Extraction,*	Pennsylvania.
Schooley, Joseph Griggs,	*Gossypium Herbaceum,*	Pennsylvania.
Shafer, Clarence Eugene,	*Malt and its Preparation,*	Pennsylvania.
Shannon, Byron Guest,	*Perfumes in the Drug Store,*	Pennsylvania.
Shoults, Robt. Grafton, P.C.,	*Examination of Acacia,*	California.
Skillman, Lionel Gilliland,	*Unguentum Hydrargyri Nitratis,*	Pennsylvania.
Slocum, Charles Eben,	*Aurum,*	Illinois.
Spears, Edward Gibson,	*Aqua Hydrogenii Dioxidi,*	Pennsylvania.
Steever, William Forsaith,	*Glyceritum Rhois Glabræ,*	Pennsylvania.
Stoudt, Irwin Sylvester,	*Capsules,*	Pennsylvania.
Stout, Benjamin Franklin,	*The Twentieth Century Pharmacist,*	Pennsylvania.
Strathie, Alexander John,	*Acidum Salicylicum,*	England.
Texter, Charles Henry,	*Horse Chestnut,*	Pennsylvania.
Tingle, John Beard,	*Flour of Sulphur,*	Ohio.
Urffer, Samuel,	*Iron,*	Pennsylvania.
VanGilder, Levi Morton,	*Diphtheria Antitoxin,*	New Jersey.
Watson, Herbert James,	*Color Standards of the Vegetable Drugs of the U. S. P.,*	Delaware.
Wilkinson, Harry,	*Surgical Antiseptics,*	Pennsylvania.
Wolfer, William Conrad,	*Antipyrin,*	Pennsylvania.
Wolfinger, John Philip,	*Erythroxylon Coca,*	Pennsylvania.
Ziegler, Charles Harry,	*Syrupus Ferri Iodidi,*	Pennsylvania.

The following received the degree of Pharmaceutical Chemist:

Name.	*Subject of Thesis.*	*State.*
Bender, Arthur Clarence,	*The Saponin of the Root of Phytolacca Decandra L.,*	Iowa.
Brookes, Virginia Cade,	*The Mesquite,*	Texas.
Graham, Willard Rice,	*Pumpkin Seed Oil,*	Pennsylvania.
Headings, Prestie Milroy,	*Glycerin,*	Pennsylvania.
Penrose, Thomas William,	*Distilled Water,*	Pennsylvania.
Pollins, Harry G. Lomison,	*The Preparation of Ointments,*	Pennsylvania.
Ryan, Thomas Andrew,	*Adeps Bezoinatus,*	Pennsylvania.
Scott, Henry William,	*Assay of Zinc Ore,*	Pennsylvania.

The Certificate of Proficiency in Chemistry was awarded to the following:

Andrews, Willard Crandall, P.D.; Cavanaugh, Frank Arthur; Ehman, Joseph William, Ph.G.; French, Rolland Hall; Smith, Frank G. D., Ph.G.; Staley, Frederick Walton; Winters, Olas Earl.

Prof. Joseph P. Remington, Dean of the Faculty made the announcement that among the prizes offered this year was one to the class as a whole. This was the President's cup offered by the President of the College, Howard B. French, in commemoration of the eightieth anniversary, and is intended also as an incentive to study to each of the individual members of the class. It is to be held in trust by this class until a succeeding class attains a higher grade of scholarship.

The Valedictory was delivered by Hon. Charles F. Warwick, who gave a short résumé of the history of the College and referred to some of the conditions existing in pharmacy and medicine in the early part of this century and compared them with those of to-day. This was followed with some very wholesome and pertinent advice to the members of the graduating class.

THE PROCTER PRIZE of a gold medal and certificate for highest grade of scholarship and meritorious thesis was awarded to Irvin E. Saul and presented by the President, Howard B. French.

THE WILLIAM B. WEBB Memorial Prize of a gold medal and certificate, offered by Mrs. Rebecca T. Webb for the highest general average in the examination of the committee, operative pharmacy and specimens, was awarded to Edwin M. Murphey and presented by William J. Jenks.

CHEMISTRY PRIZE, a prize of $25 in gold offered by Prof. Samuel P. Sadtler, for knowledge of quantitative chemical analysis, was awarded to Earl H. Cone.

MATERIA MEDICA PRIZE, a prize of $25 by Prof. Clement B. Lowe, for the recognition of rare drugs, was awarded to Lionel G. Skillman.

PHARMACOGNOSY PRIZE, a prize of $25 by Prof. Henry Kraemer for the best thesis on the Pharmacognosy of vegetable drugs, was awarded to Herbert J. Watson.

THE MAISCH PRIZE, a prize of $20, offered by Mr. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, was awarded to Lionel G. Skillman and presented by Joseph L. Lemberger.

OPERATIVE PHARMACY PRIZE, a prize of $20 in gold, offered by Prof. Joseph P. Remington for the best examination in operative pharmacy, was awarded to Edward J. Klopp, the presentation being made by James T. Shinn.

THEORETICAL PHARMACY PRIZE, a prize of a fine Troemner agate prescription balance, offered by Mahlon N. Kline, for the best examination in theory and practice of pharmacy, was awarded to Irvin E. Saul.

COMPLIMENTARY SUPPER OF THE FACULTY.

The professors' farewell supper to the graduates was given on Tuesday evening, April 16th, in the Museum of the College. Many of the officers and trustees of the College were present, as also other invited guests. The supper having been served, the remainder of the evening was devoted to toast-making and other matters of interest. The President's cup, which has already been alluded to, was presented on this occasion. It is of silver, and is in the form of a loving cup, being 12 inches in height and 7¾ inches in diameter, and is inscribed in an appropriate manner. The cup was received on behalf of the class by Victor C. Michels.

A very gratifying feature of the occasion was the presentation to the College of a portrait painting of the late Charles August Heinitsh, on behalf of his friends of the Pennsylvania Pharmaceutical Association, by Joseph L. Lemberger, who gave a brief but impressive sketch of the life and character of Mr. Heinitsh.

This was succeeded by another interesting presentation, viz., a portrait of the late Dr. Edward R. Squibb, which was presented on behalf of his family by Prof. Joseph P. Remington. Professor Remington having enjoyed a long personal acquaintance with Dr. Squibb, spoke in a manner befitting his work and attainments, and his influence on pharmacy and medicine. The President accepted both of these presents on behalf of the College, and said that there was no more fitting place for them than the Philadelphia College of Pharmacy.

Professor Remington, as Dean of the Faculty, acted as toast-master, and toasts were responded to by the members of the Faculty and Instructors, some of the members of the College and Board of Trustees, and by many of the members of the graduating class.

BACCALAUREATE SERMON.

In connection with the other exercises of Commencement Week, a baccalaureate sermon was delivered to the graduates on Sunday, April 14th, by Dr. C. E. Stevens, Rector of Christ Church, Second and Market Streets. Incidentally it may be mentioned that this church is one of the most interesting structures in Philadelphia, retaining the architectural appearance of the early colonial time, and having been the place of worship of Franklin and the early Presidents of the United States.

THE ALUMNI ASSOCIATION.

The thirty-seventh annual meeting of the Alumni Association was held in Alumni Hall, on Monday afternoon, April 15th, with the President, Theodore Campbell, in the chair.

Following the annual address of the President, in which a number of recommendations were made relative to the interests of the Association, reports from the Treasurer, Secretary and Editor of the ALUMNI REPORT were read. Reports were also received from the several standing committees of the Association.

The following is the list of officers elected for the ensuing year: President, John H. Hahn; First Vice-President, Wm. G. Nebig; Second Vice-President, Albert Oetinger; Recording Secretary, Wm. E. Krewson; Treasurer, C. C. Meyer; Corresponding Secretary, J. M. Baer; Board of Directors: O. W. Osterlund, F. P. Stroup, Nicholas F. Weisner, Herman Dilks, Jr., and L. S. King.

The thirty-seventh annual reception of the Association was given to the graduating class, on the evening of the same day, in the College Museum.

Introductory remarks having been made by the President, the Secretary called the roll of members elected during 1900-01. An address to the new members was then delivered by Jos. L. Lemberger, of Lebanon, Pa.

The several prizes offered by the Association were presented as follows:

The Alumni gold medal to the member of the graduating class receiving the highest general average, was awarded to Irvin Ellsworth Saul, the presentation being made by the President, Theodore Campbell.

The Alumni prize certificates to the members of the class receiving the highest averages in each of the branches, were awarded as follows, Mr. Mahlon N. Kline making the presentation: In Pharmacy, to Irvin Ellsworth Saul; in Chemistry, to Edwin Mason Murphey; in Materia Medica, to Lionel Gilliland Skillman; in General Pharmacy, to Rolland Hall French; in Operative Pharmacy, to Edward Jonathan Klopp; in Analytical Chemistry, to Frederick George Luebert; in Pharmacognosy, to Howard Romaino Converse.

The Alumni silver medal was awarded to David Wilfong Ramsaur, of Palatka, Fla., for the best general average in the second year examination.

The Alumni bronze medal was awarded to Chester Augustus Billetdoux, of North Adams, Mass., for the best general average in the first year examination.

The class oration was given by Theodore K. Boesch; the poem by Fielding O. Lewis; the history, by James S. Jetton, and the prophecy, by Alexander J. Strathie.

ANNUAL MEETING OF THE COLLEGE.

The annual meeting of the members of the Philadelphia College of Pharmacy was held on March 25, 1901, at the College, 145 North Tenth Street. Forty-one members were present, the President, Howard B. French, presiding. The minutes of the quarterly meeting held December 31, 1900, were read and approved. The minutes of the Board of Trustees for the meetings in January, February and March were read by the Registrar, W. Nelson Stem, and approved as read.

The annual meeting being the occasion for reports of the officers and Standing Committees, these were given in the following order:

Committee on Publication by H. N. Rittenhouse, who among other things called attention to the fact that all bills for the past year have been paid, and there is a cash balance to the credit of the committee. There has been an observance of economy in several respects.

During the year a number of problems have been considered by the committee, and while no radical measures have been attempted everything in the direction of a wise economy has been realized. The number of unsold volumes on hand is about 1,600, covering the period from 1829 to date.

Editor's Report, by Henry Kraemer. Alluding to the beginning of the new century, the editor gave a retrospective view of the JOURNAL and followed with a consideration of the problems of the present and giving some suggestions in regard to the future.

Librarian's Report, by Thomas S. Wiegand. This report states that 210 volumes have been added during the year, besides a large number of pamphlets.

The library has been consulted much more during the past year than for several years past.

Committee on Pharmaceutical Meetings, by Henry Kraemer. These meetings have been held regularly during the College year. The programs have been full of interesting and valuable matter, and in this respect have been as successful as could be desired.

Curator's Report, by Joseph W. England. He reports the museum in good condition, and has received a number of accessions during the year. The working collection of official drugs and preparations placed in the reading room has been in daily use by a large number of students, and has proven of great value to them.

A new feature of the annual meeting was the report of the President, giving concise information as to the affairs of the College. There has been a slight decrease in the College debt from the previous year.

There has been established during the year the Keasby and Mattison scholarship, making a total of six scholarships now available.

The property has been well cared for and kept fully up to its past standard.

The adoption of an amendment to the By-Laws creating a Committee on Nominations, it is believed will prove of material advantage to the College.

The President alluded to the kind consideration shown him during the year, and concluded by stating that the continued success and prosperity of the College depends upon the active co-operation of all the members.

Delegates were appointed as follows:

American Pharmaceutical Association, at St. Louis, September 16, 1901—Prof. Henry Kraemer, William L. Cliffe, William McIntyre, J. H. Redsecker and Prof. C. B. Lowe.

To the Pennsyvania Pharmaceutical Association at Harvey's Lake, June 18-20, 1901—Mahlon N. Kline, Harry L. Stiles, E M. Boring, Joseph W. England and C. A. Weidemann.

Fred T. Gordon offered the following resolution, which was adopted:

"*Resolved*, That the professors of the College recommend to the students the queries of the Pennsylvania Pharmaceutical Association as suitable subjects for theses, and that this be referred to the Committee on Theses for action."

The election of officers, Trustees and Standing Committees being next in order, William McIntyre and Henry C. Blair, third, were appointed tellers, who reported the following as being elected:

President, Howard B. French; First Vice-President, William J. Jenks; Second Vice-President, Dr. R. V. Mattison; Recording Secretary, Dr. C. A. Weidemann; Corresponding Secretary, Dr. A. W. Miller; Treasurer, James T. Shinn; Librarian, Thomas S. Wiegand; Curator, Joseph W. England; Editor, Prof. Henry Kraemer.

Trustees for three years: Prof. Samuel P. Sadtler, William L. Cliffe and Joseph L. Lemberger. Committee on Publication: Henry N. Rittenhouse, Prof. Samuel P. Sadtler, Wallace Procter, Prof. Henry Kraemer, Joseph W. England, Prof. Joseph P. Remington and Dr. R. V. Mattison. Committee on Pharmaceutical Meetings—Dr. R. V. Mattison, Prof. Joseph P. Remington, Prof. C. B. Lowe, F. W. E. Stedem, Prof. Henry Kraemer.

C. A. WEIDEMANN, M.D.,
Secretary.

Charles Rice

THE AMERICAN

JOURNAL OF PHARMACY

JUNE, 1901.

RECENT DEVELOPMENTS IN THE STUDY OF THE RELATIONSHIP BETWEEN CHEMICAL CONSTITUTION AND PHYSIOLOGICAL ACTION OF ORGANIC COMPOUNDS.

BY PROF. VIRGIL COBLENTZ.

The object of this paper is to present, in as concise a manner as possible, the outline of a few selected topics bearing upon this subject. At a future date a more complete presentation of this subject will be made. Those interested in modern synthetics will find a general résumé of the subject in the *Journal of the Society of Chemical Industry*, Vol. xvii, No. 8.

The long well-known fact that certain relations existed between physiological action, molecular weight and isomorphous inorganic bodies led to a similar study of organics. This subject received its direct stimulus by Fischer's discovery of Kairine in 1882, followed by the accidental discovery of the antipyretic properties of acetanilid in 1887.

A proof that a close relationship exists between chemical constitution and physiological action is shown by the fact that certain changes in chemical structure or constitution causes like changes in the physiological action of similar bodies; further, the addition of certain groups to compounds of different action produces bodies of similar physiological action or are alike rendered inactive.

According to Crum Brown and Fraser the methylating of different alkaloids of different physiological action produces compounds which paralyze all the motoric nerve terminals like curarin.

The introduction of the carboxyl (COOH) or the sulphonic acid (SO_3H) groups into bodies of well defined toxic properties, results

in a marked diminution or total disappearance of their action, as for example

Benzole C_6H_6 — Benzoic acid C_6H_5COOH

Phenol C_6H_5OH — Para-phenol sulphonic acid $C_6H_4\left\langle\begin{array}{l}OH\\SO_3H\end{array}\right.$

Phenyl sulphonic acid $C_6H_5 - O - SO_3H$

Ortho-phenol carboxylic acid $C_6H_4\left\langle\begin{array}{l}OH\\COOH\end{array}\right.$

Naphtalin $C_{10}H_8$ — Naphtoic acid $C_{10}H_7COOH$

Ammonia NH_3 — Glycocoll CH_2NH_2COOH

Morphin $C_{17}H_{17}\left\langle\begin{array}{l}OH\\NO-OH\end{array}\right.$ — Morphin sulphonic acid $C_{17}H_{17}\left\langle\begin{array}{l}OH\\NO-SO_3H\end{array}\right.$

(May be given in five times the morphin dose.)

Naphtol yellow $C_{10}H_4\left\langle\begin{array}{l}OH\\-(NO_2)_2\\SO_3H\end{array}\right.$ a non-toxic derivative of toxic Martiu's yellow.

It is immaterial if the sulphonic acid group is united to a carbon or oxygen.

The toxicity of the organic acids decreases with the increase of carboxyl groups, as from formic and acetic acids to tartaric and citric acids. The toxic characters of oxalic acid [$(COOH)_2$] are due to the double

$$\left(\begin{array}{c}Co\\Co\end{array}\right)$$

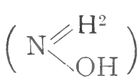
carboxyl group which in effect resembles the dicyanogen

$$\left(\begin{array}{c}Cn\\|\\Cn\end{array}\right)$$

The stability of the carboxyl and sulphonic acid groups serves to protect these derivatives from breaking up in the system and exerting toxic action. That certain groups lose their specific action through simple changes in the molecular structure is explained physiologically in that certain cell groups of the organism exert a

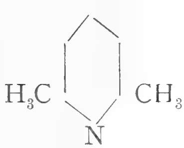
selective influence upon exposed groups of the molecule, thereby anchoring the entire complex in certain tissues where they break up and exert their action. This is especially noticeable through changing terminal or exposed groups when the action fails entirely, although the nucleus remains intact.

The theory of Loew,[1] which aims to explain the chemical constitution of living protoplasm, claims that all substances which in great dilution react with aldehyde or amido groups, are toxic to all forms of life, and the greater the reactive ability of a substance with reference to these groups, the greater its activity and toxicity. Such bases as hydroxylamine

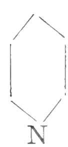


and diamid $H_2N — NH_2$ which react readily with aldehydes and ketones are active poisons for plants and animals. Phenylhydrazine ($C_6H_5NH — NH_2$), which is especially reactive towards aldehydes (R — CHO), and the Keto (R — CO — R) groups is on the same ground a violent blood poison.

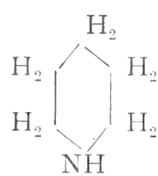
Bodies containing a tertiary nitrogen and possessing slight or no toxic properties, become very poisonous through reduction and formation of an imido group.



Collidin



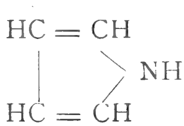
Pyridin



Piperidin

Thus pyridin is more toxic than collidin, and piperidin more than either of the others.

Tetrahydro quinolin is far more energetic than quinolin, likewise pyrrol



Pyrrol

is more poisonous than pyridin.

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[1] Die chemische Energie der lebenden Zellen.

Loew explains this by the increase of reactive ability towards the aldehyde groups of the protoplasm. This theory is supported by the observation that bodies with labile amido groups increase in toxicity when a second amido group is introduced. This decreases, however, when the amido (NH_2 —) group is converted into an imido (— NH) group. Thus the phenylene diamines

$$C_6H_4\begin{cases} NH_2 \\ NH_2 \end{cases}$$

are more toxic than

$$C_6H_4\begin{cases} CH_3 \\ NH_2 \end{cases}$$

toluidin, also when one H of the amido group in anilin ($C_6H_5NH_2$) is replaced by an acid radical as acetyl (CH_3CO) or benzoyl (C_6H_5CO) as in acetanilid ($C_6H_5NHCH_3CO$) or benzanilid ($C_6H_5NHC_6H_5CO$) these bodies react less readily than anilin with aldehydes.

Our greatest difficulty is accountable to our fragmentary knowledge of the selective powers of the human organs and tissues, which has been only partially established through histological staining and toxicological experiments. Loew's views enlighten us only upon certain groups of bodies which react with aldehydes and amido groups.

INFLUENCE OF HYDROXYL GROUPS.

The introduction of hydroxyl (—OH) groups in aliphatic bodies modifies their action, which decreases with their increase in number. Thus the narcotic alcohols and aldehydes the harmless glycols, glycerols and aldols, still more marked is the change exemplified in the polyhydric alcohols, as heptol, mannitol, etc. The presence of this group in caffeine practically destroys its effect. These groups so affect the stability of a compound that its decomposition in the system is readily effected. The replacement of one H in the benzole ring increases its reactive ability and convulsive action, decreasing with an increase in number, but toxic action in another direction increases accordingly, from phenol (C_6H_5OH) to resorcinol ($C_6H_4(OH)_2$ 1·3.) to phloroglucin ($C_6H_3(OH)_3$ 1·3·5), chronic convulsions result through action upon the spinal cord. Toxicity and

physiologic action depend largely upon the relative position of the replacing groups.

In general, substitution lessens the toxic characters of phenols, provided the entering groups are not toxic—for example, salicylic acid, gallic acid, sulfocarbolic acid.

The hydroxyl group is intimately associated with the toxic action of morphin, which, through its *narcotic* characters, differs from all other opium alkaloids, its action being chiefly upon the *nerve centers* of the brain. Upon closing these OH groups through the replacement of one or both of the hydrogens by alkyl or acid radicals, the narcotic characters disappear, where, on the other hand, a *spinal excitant* (tetanic action) is developed, increasing with the number of alkyl radicals introduced. Thus codein produces like morphin (but in lesser degree) narcosis followed by an elevated reflex excitability which, if the dose is sufficiently large, develops tetanic convulsions. Dionin (ethyl ether of morphin) is more active than codein. Other members of this class are Peronin (benzyl morphin) and Heroin (di-acetyl morphin). These substances, while less active for relieving pain, exert a sedative effect on the unstriped muscles of the bronchi and reduce the disposition to cough, hence are of value in phthisis, bronchitis, asthma, etc.

Morphin $C_{17}H_{17}\left\langle\begin{matrix} OH \\ NO \cdot OH \end{matrix}\right.$

Codein $C_{17}H_{17}\left\langle\begin{matrix} OH \\ NO \cdot OCH_3 \end{matrix}\right.$ *Methyl morphin.*

Dionin $C_{17}H_{17}\left\langle\begin{matrix} OH \\ NO \cdot OC_2H_5 \end{matrix}\right.$ *Ethyl morphin.*

Peronin $C_{17}H_{17}\left\langle\begin{matrix} OH \\ NO \cdot OC_6H_5CH_2 \end{matrix}\right.$ *Benzyl morphin.*

Heroin $C_{17}H_{17}\left\langle\begin{matrix} O - CH_3CO \\ NO \cdot O - CH_3CO \end{matrix}\right\rangle$ *Di-acetyl-morphin.*

The most toxic alkaloid of opium is Thebaïn, which, according to Stockmann, aside from its narcotic action in small doses, is identical in tetanic effect to strychnin.

$$C_{17}H_{15}\begin{cases} OCH_3 \\ NO \,.\, OCH_3 \end{cases}$$ Thebaïn.

Pyrocatechol ($C_6H_4(OH)_2$ 1.2.) through conversion into guaiacol

$$\left(C_6H_4\begin{cases} OH \\ O \,.\, CH_3 \end{cases}\right)$$

develops an irritating action on the spinal cord.

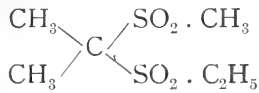
Observations prove that it is not the hydroxyl groups in themselves nor always the terminal groups that determine solely the action of a substance, but the character and complexity of the molecule. However, these groups assist in bringing the entire molecule into action with certain chemical compounds in the organism. When the reactive group which exerts the selective action of the compound in the organism is slightly altered or covered, then under conditions we can prevent the action of the entire compound. Between such terminal groups as hydroxyl or methoxyl and certain nerve centers or points in the organism where chemical substances react, definite chemical relations must exist. Through changes in these terminal groups we are able to move the point of attack of the substance or to render it absolutely inactive, but as long as it remains active, the fundamental characters of its action (although frequently modified) always manifest themselves, as for example the alkaloids and their derivatives.

INTRODUCTION OF ALKYL RESTS.

The replacement of a hydroxyl by an alkyl rest renders the entire body chemically and pharmacologically more resistant to oxidation in the system. Alkyl groups, more especially the ethyl, impart a narcotic effect. This narcotic and analgesic action is independent of the chemical character of the substance, it being a specific property of this group alone. The methyl group exerts a like effect, but much weaker and less certain. Higher alkyl rests present no advantages over the ethyl. Thus, through the introduction of an oxyethyl group into caffeine (ethoxycaffeine) an additional narcotic action is developed.

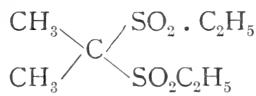
Disulfones which contain ethyl ($—C_2H_5$) groups are active, and the intensity of effect evidently depends upon the number of such groupings contained in the molecule.

A disulfone containing but one ethyl group



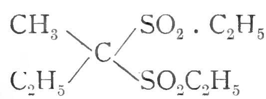
Ethyl-methyl-sulfone-di-methyl-methane

produces an effect only half as intense as that of one containing two such groups as sulfonal,



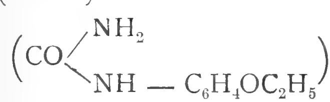
Diethyl-sulfone-di-methyl-methane.

Again, sulfonal is less active than trional, containing three ethyl groups.



Diethyl sulfone-methyl ethyl-methane.

Tetronal $(C_2H_5)_2C(SO_2C_2H_5)_2)$ containing four ethyl groups is more markedly sedative than hypnotic. An interesting fact is that para-phenetol carbamid (Dulcin)



is sweet, while the methyl derivative is tasteless. The ethyl group has a certain fixed relationship to the nervous system, as shown by most bodies containing the ethyl radical. Ehrlich has found that ethylated colors stain the nerve cells, while those containing methyl groups failed.

CHLORIN.

In general the introduction of chlorin in aliphatic compounds produces bodies of a more or less narcotic action where active antiseptics result if the substituted body belongs to the aromatic series. Too extensive a substitution will develop unpleasant caustic action. The introduction of bromin does not yield compounds of any greater antiseptic value than those produced by iodin.

Iodin imparts to all bodies of both series strong antiseptic properties, promoting resorbtion and granulation. The substituted

iodin should be in a sufficient unstable condition so that under influence of the secretions it will be slowly liberated.

The toxic effect of aliphatic chlorinated products stands in direct ratio to their narcotic action; the more chlorine introduced the greater the toxicity, when otherwise no change in stability and physical relationship has occurred. Thus methylene chlorid (CH_2Cl_2) is less toxic than chloroform ($CHCl_3$) and is a lighter anæsthetic. On the other hand, tetra chlor methane (CCl_4) is far more dangerous than chloroform. The simpler aldehydes, as formaldehyde ($HCHO$) or acetaldehyde (CH_3CHO) are of an irritating nature. This character disappears upon the introduction of chlorin, attaining a maximum hypnotic effect in the tri chlor-substitution product (chloral CCl_3CHO). The antiseptic effect of the benzole derivatives increases with addition of halogens; thus para-chlorophenol

$$\left(C_6H_4\begin{matrix}\diagup Cl\ (4)\\ \diagdown OH\ (1)\end{matrix}\right)$$

trichloro-phenol

$$\left(C_6H_2\begin{matrix}\diagup Cl_3\\ \diagdown OH\end{matrix}\right)$$

and tri bromo-phenol

$$\left(\text{Bromol } C_6H_2\begin{matrix}\diagup Br_3\\ \diagdown OH\end{matrix}\right)$$

are all active antiseptics, the latter being the most active.

The iodin substitution products play a still more important part among the antiseptics, as, for example iodoform (CHI_3), iodo cresol

$$\left(\text{Traumatol } C_6HI_3\begin{matrix}\diagup OH\\ \diagdown CH_3\end{matrix}\right.$$

tri-iodo cresol

$$\left(\text{Losophan } C_6HI_3\begin{matrix}\diagup OH\\ \diagdown CH\end{matrix}\right)$$

Aristol (di-thymol-di-iodid), Europhan (iso-butyl-cresol-iodid ($C_6H_3(C_4H_9)CH_3O)_2HI$).

DOUBLE LINKAGE.

According to Loew, "bodies with double linkage are more toxic than the corresponding saturated ones."

For example, Dr. Miessner has shown that those engaged in the preparation of allyl alcohol

$$\begin{array}{l} CH_2 \\ \| \\ CH \\ | \\ CH_2OH \end{array}$$

suffer serious toxic symptoms, while the corresponding saturated propyl alcohol

$$\begin{array}{l} CH_3 \\ | \\ CH_2 \\ | \\ CH_2OH \end{array}$$

is non toxic.

The trebly linked di-iodo-acetyliden

$$\begin{array}{l} CI \\ ||| \\ CI \end{array}$$

is an energetic poison, likewise allylamin ($CH_2 = CH - CH_2 NH_2$) also vinylamin ($CH_2 = CH . NH_2$).

The same influence is noticeable in the non-toxic singly linked alkyl groups of cholin as compared to the very toxic doubly linked in neurin.

Cholin $(CH_3)_3N\begin{array}{l} \diagup CH_2 - CH_2OH \\ \diagdown OH \end{array}$ *Tri-methyl-oxy-ethyl ammon-hydroxid*

Neurin $(CH_3)_3N\begin{array}{l} \diagup CH = CH_2 \\ \diagdown OH \end{array}$ *Tri-methyl-vinyl-ammon-hydroxid.*

Allyl mustard oil

$$\begin{array}{l} CH_2 \\ \| \\ CH \\ | \\ CH_2 - NCS \end{array}$$

acrolein

$$\begin{array}{c} CH_2 \\ \| \\ CH \\ | \\ CHO, \end{array}$$

and crotonic aldehyde ($CH_3 - CH = CH - CHO$) are all more toxic than the corresponding saturated groups.

(*To be continued.*)

THE STORY OF THE PAPAW.

BY F. B. KILMER.

"The slim papaya ripens its yellow fruit for thee."—*Bryant.*

Grant Allen tells us that no plant can be properly understood apart from its native place. Therefore, we begin our study of the *Carica Papaya* in its tropical home.

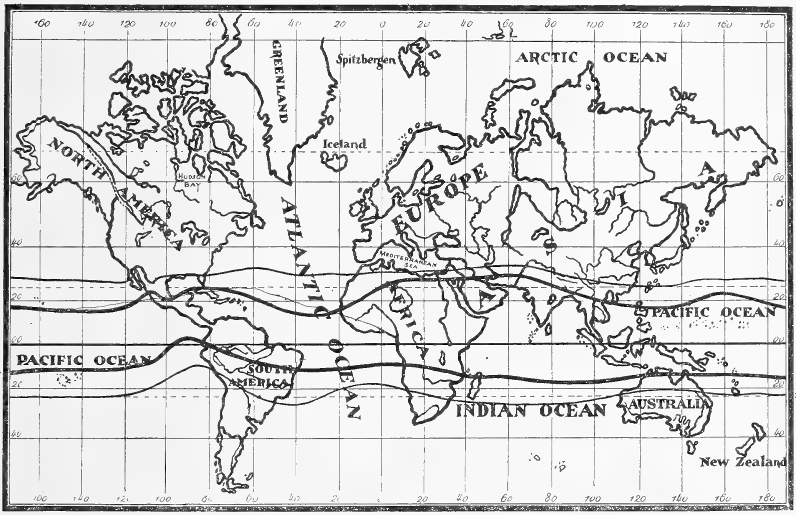
The *Carica Papaya* is accredited as indigenous in Central America. Observations and correspondence lead me to conclude that it has become acclimated in the hot regions of three continents. The zone of most abundant growth seems to lie between the isothermal lines of 77°, wherever soil and rainfall are favorable. It is grown by cultivation north and south of these lines. (The papaw is seen as far north as Jacksonville, Fla., and in Southern California.)

In these tropical lands, where every tree or plant has its peculiar legends and myths, the views of the natives upon plant life are considered unscientific and valueless, but I have found that, when stripped of the terms of superstition, some of their observations, compared with our scientific knowledge, are not far apart. Their apparent veneration for trees and plants is based upon intimate association, wherein they have come to a knowledge that plants eat, drink, marry, propagate, care for their offspring and bestow blessings or curses upon all living things, including man. This is about all that anybody can know about them.

Many trees are famous in these lands, none more so than the papaw. Conflicting stories as to its powers and properties are due somewhat largely to the fact that different species, or variations in species possessing varying characteristics, are found in these localities.

Quite universal is the knowledge of the unique property that has given to this tree its world-wide fame, viz.: the power of its milky

juice to soften and dissolve tough meat. The statement has passed current in our journals that the emanations from this tree will dissolve and digest albumin, and that it is the custom of natives to hang meat and chickens in the branches of a tree to render them tender and edible. The natives often go farther than this; they state that if male animals browse under the papaw tree, they thereby become emasculated. If we compare this statement with the alleged property of the roots as a generative tonic, we shall have a marvellous combination of an aphrodisiac and an anaphrodisiac in the same plant.



The Carica Papaya grows prolifically between isothermal lines of 77°; is grown by cultivation between the lines of 70°.

It is needless to urge that such stories are exaggerations of the pepsin-like properties of the fruit.

The native uses of the papaw are numerous and varied. The bark is used in the manufacture of ropes; the fruit is edible, and, according to local conditions, may be sweet, refreshing and agreeable, or in other localities it is sickly, sweet and insipid. The fruits find a large consumption by the natives, and are considered very nutritious.

At the corner of a sugar-cane field where the ragged canes bend over in a wild green, brown and yellow tangle, there will be stand-

ing a papaw tree, and if the time of the papaw has quite come, beneath the tree will be assembled a half dozen negroes.

The ripe fruit is eaten as we eat melons. Salt enhances the flavor, and some users add sugar. The melons must be perfectly ripe when eaten raw, as the green fruit contains a strongly marked acrid principle. The color of the ripe fruit is more or less that of our very yellow muskmelon. The sweetness of its resinous, pulpy juice clings to the tongue and remains prevalent for some hours.

The natives enjoy the flavor, while the stranger has to acquire the liking. Excellent preserves are made of the ripe fruit, which, for this purpose, is boiled down in sugar and candied (like citron).

At the sugarhouses slices of the papaw are often seen seething in hot syrup. The slices of melon combined with some acid fruit is made into native tarts, which articles correspond more or less to what we call "pies." The fruit is also stewed and served on the table. The green fruit is made into plain and spiced pickles, which are highly esteemed.

The fruit, just before ripening, is peeled and sliced, macerated in cold water, with frequent changes of the water for some hours; the then macerated fruit is dropped into boiling water, boiled sharply and then served as a vegetable.

In every tropical village one will find a market place set apart where the native products are bought and sold, and in such a place by the roadside, under the shade, are the market women in their quaint baskets or bowls, the traveller finds an astonishing and puzzling variety of green and yellow colored fruits and vegetables. The papaw is always there in abundance, and a most frequent cry of the sellers is, "Aqui estan las Mameo," or "Ca qui ulè papayá ca qui ule."

As an article of food one finds the papaw prepared in a score of ways, making a variety of edible dishes, which, from the native standpoint, would be expressed in our language as "wondrous and nutritious delicacies."

A plant so universally distributed and possessed with such varied properties, naturally takes an important place in the native materia medica. In the native parlance, "It makes him much well."

The seeds are reputed as anthelmintic[1] and emmenagogue; they are also used as a thirst quencher, form component parts of a drink used in fevers, as well as being used as a carminative. Syrups,

wines and elixirs made from the ripe fruit are expectorant, sedative and tonic.

A malady which the natives call the "cocoa bag," is a troublesome tropical disease, reputed to be hereditary and contagious; at all events, it seems to lurk in the blood of persons of otherwise apparently good health and habits. Suddenly the victim becomes a mass of offensive sores, debilitated, etc. The native doctors add the papaw fruit to the diet drinks used in this disease, and succeed in moderating its violence, at least. To the sores a paste made with the papaw milk as one of the constituents is also applied.

The slight pimples accompanying the first stages of the yaws soon spread into ulcerous sores that cover the entire body. Here, too, the claim is made that a slice of the papaw rubbed over the pimples will abort them. It is also claimed that the ulcers may be cleaned in a similar fashion.

I witnessed a most striking cleansing of a black foot in which the chiga had bored and laid its eggs, producing a mass of foulness beyond description. Here a paste of the papaw milk was pushed into the seething mass and kept there for forty-eight hours. It was then flushed, curetted, and antiseptics were applied. A clean wound which readily healed, resulted.

The green leaves or slices of the green fruit of the papaw are rubbed over soiled and spotted clothes, and by its power of dissolving stains, papaw has acquired the name of "melon bleach." The leaves or a portion of the fruit are steeped in water and the treated water is used in washing colored clothing, especially black, the colors are cleaned up and held fast.

The seeds are eaten as a delicacy. They have quite an agreeable taste, something on the order of the water-cress and a piquancy slightly suggestive of the mustard family. Macerated in vinegar they are served as a condiment.[2]

The strange and beautiful races of the Antilles astonish the eyes of the traveller who sees them for the first time. It has been said that they have taken their black, brown and olive and yellow skin tints

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[1] The anthelmintic properties residing in both the seed and juice have been noted by various authorities.

[2] The seeds are encased in a slimy coating and advantage is taken of this by the younger generation, who spread them out on a board, and by this means form a "slide," which corresponds with the frozen gutters so agreeable to our northern urchins.

from the satiny and bright hued rinds of the fruits which surround them. If they are to be believed, the mystery of their clear, clean complexion and exquisite pulp-like flesh arises from the use of the papaw fruit as a cosmetic. A slice of the ripe fruit is rubbed over the skin and is said to dissolve spare flesh and remove every blemish. It is a toilet requisite in use by the young and old, producing, according to the words of a French writer, " the most beautiful specimens of the human race."

The papaw has been brought to America as a cure for the national disease, dyspepsia. In its tropical home there are no dyspeptics, but its use along similar lines is by no means unknown.

The meat in these countries is tough and tasteless; beef, mutton, pork or fowl have the same flavor, and are as tough as hickory wood; boiling until they fall to pieces does not render them any more edible; they simply change from solid wood to fine tough splinters.

One reason for this is that in this climate meat must be eaten immediately after slaughter. (It often reaches the pot in an hour after killing.) The papaw helps to overcome this Rubbed over tough meat it will render it soft and change a piece of apparent leather to a tender, juicy steak. It is put into the pot with meat, enters into the cereals, soups, stews and other dishes, and they are made at least more edible and digestible.

Most of the half-breeds of Indian extraction upon the South American Continent and adjacent islands are particularly given to meat diet; many of them eat it raw,[3] sometimes in a state of partial decay, and here the papaw is brought into use, being eaten with the flesh or rubbed over it before it is eaten.

Some of these people are great gluttons; they gorge themselves until the skin on their distended stomach is stretched to its utmost. It is certain that no human being could digest the kind of food and the enormous amounts they consume without the kindly aid of the papaw fruit to assist digestion.

NAMES AND CHARACTERISTICS.

The botanical characteristics of this family having been more or less completely described by various authors, need not here be

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[3] In Bolivia and Paraguay it is a very common sight at the railway stations to see raw meat peddled out in chunks to passengers.

repeated. Of the many species the following are edible: *Carica cauliflora, C. pyriformis, C. microcarpa, C. integrifolia, C. Papaya* and *C. quercifolia.*

The *Carica digitata* is credited with poisonous emanations, and its juice is actively poisonous, causing pustulation when applied to the flesh.

The *Carica Papaya* is designated by different names in the various localities where found. For instance, in Mexico, "lechoso," in Brazil, "papai," "maneo" and "mamerio"; in Paraguay, "mamon."[4]

Here, too, the term "jacarata" (chakarateca) is applied to the *Carica Papaya,* as well as to several trees of the same natural order. In Yucatan the native uncultivated variety is designated as "chich put," or little papaya, while the cultivated is simply "put." The Spaniards designated the original species as "papaya los pajaros" or "bird papaya." The term "papaw," though sometimes applied to several species, almost universally means the Carica Papaya.

Among the names by which botanists have designated this plant are the following: Papaya fructu melopeponis, Tuournefort; Papaya Carica, Gaertn; P. lyatira, Tuss; P. vulgaris, A. D. C.; P. Orientales Col.; Carica Papaya, L.; C. Maniaya, Vell.

The *Carica Papaya* may, in brief, be described as follows:

A single, supple, slim, straight stalk, terminating in a group of large leaves which are arranged in the form of an umbrella, branching only when its growth is interfered with. Cultivated plants attain a height of from 10 to 30 feet; wild varieties push up to 60 or even to 100 feet. Near the base of mature trees the diameter ranges from 6 inches to 1 foot. In a young plant the stalks consist of a cellular pith filled with water; in a mature tree that portion of the trunk immediately under the bark is fibrous for a few inches, followed by a soft inner layer of an inch or more, terminating in the central portion, which is hollow. At intervals through the hollow centre are seen membranous tissues dividing the cavities into sections, and in the rainy season, for a considerable height up the trunk, this central cavity is filled with water. The wood of the

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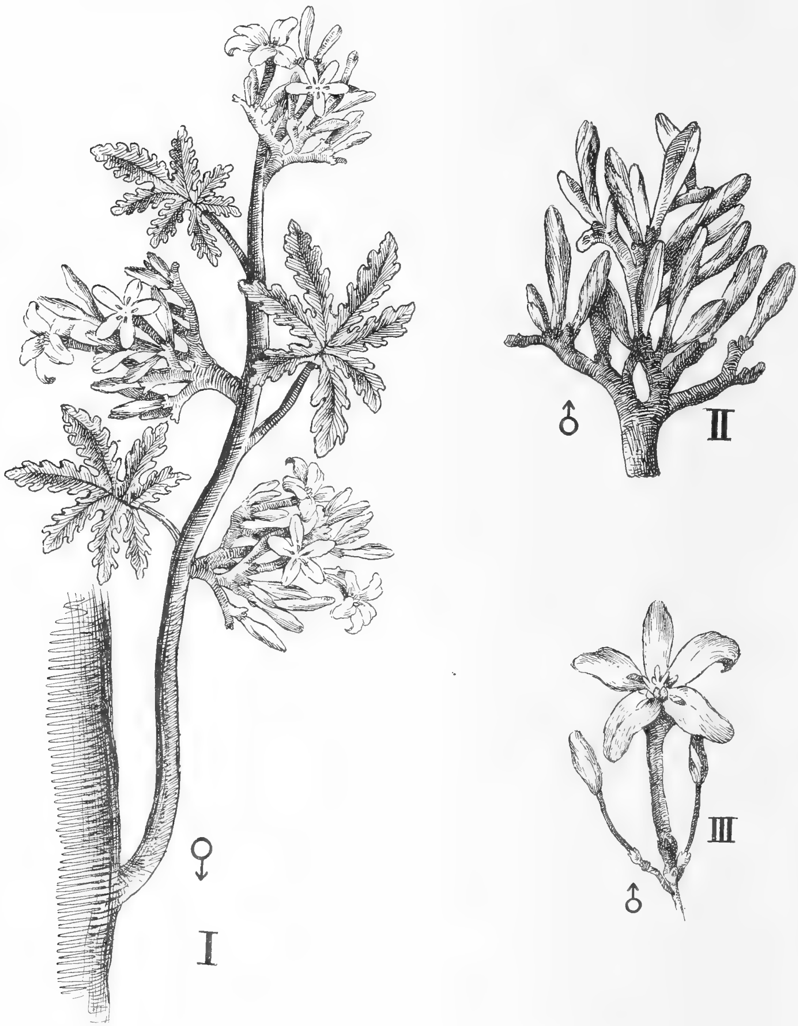
[4] In Brazil the uncultivated plant is designated as "mameo-femeo"; the cultivated form of the same as "mameo-meleo;" the hermaphrodite plant "meneco-macho."—(Rusby.)

papaw is soft, white and spongy ; cuts easier than a potato ; is full of water, decays rapidly, and is not useful for any purpose. The trunk is covered with a gray (green at the top) smooth, tough bark



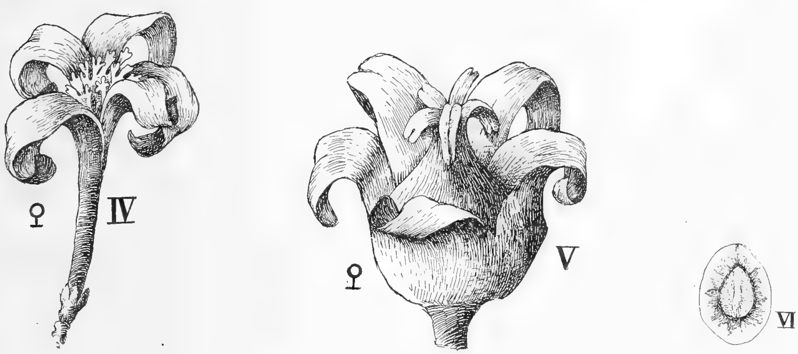
I.—Carica Papaya, branch of Male or Hanging Papaw.
II.—Staminate flower.
III.—Male flower.

laid on in folds, which at intervals form rings.

A large turnip-shaped tap-root reaches down to seek nourishment

and to give stability to the tree. These roots are similar in structure to the trunk, except for a white bark, and possess an odor of cabbage and a peculiar taste suggesting radishes. The leaf stems are large and hollow, cylindrical toward the leaf and flattened at the point where they join with the stalk. The leaves are large palm-lobed, with somewhat deep indentations, dark green on the upper and light green on the under side. They are short-lived and, as the tree shoots upward, they drop off, leaving scarry marks in the bark of the tree trunk.

The locality where grown, as well as the effects of cultivation, modify the character of this plant, hence we find on record varying



IV.—Pistillate flower.
V.—Young fruit.
VI.—Seed seen in section.

descriptions and statements. Among the notable varieties of the Carica Papaya are the green and violet. The latter species which has had considerable attention paid to it, is the one most highly esteemed for cultivation, but does not attain great height. The stalk and limb portion of the leaves are violet color. The fruit is large, often weighing as high as twenty pounds, and when ripe is very sweet. While young the trees are kept shady, and pruned to prevent their growing tall. To encourage fruit, portions of the flowers are picked off; the smaller fruits are removed when green, so that the remainder will grow larger and stronger. By cultivation a dwarfed variety ("lechoso enana") is produced. The green Carica grows to greater height than the purple; its fruits are smaller and possess a less agreeable flavor.

The three forms of flower present in the papaw are, according to

the native description, classified as varieties. The so-called female trees bear only fruiting flowers and produce the largest fruit and the greatest numbers. These flowers are single, with a yellow (or purple) corolla with five sessile petals, growing in considerable numbers at the apex of the stalk, which rapidly pushes upward and puts out new leaf stems. The fruit development is so rapid that buds, flowers, green and ripe fruit are often seen at the same time. The male flowers are borne on hanging stems, ranging from 6 inches to 1 foot or more in length (hence the "hanging papaw"), and may be white, bright yellow, sometimes tinged with purple, often developing considerable fragrance. The hanging stems in older trees bear fruiting flowers and present a somewhat curious sight. The fruit of the hanging papaw is not large, but is very sweet. The fruits vary considerably in form as well as in size. They are orange shaped, squash-like or quite resembling the cocoa pod; again, they resemble muskmelons, and in the highly cultivated variety watermelon shapes are seen. The fruits are green (or purplish cast) turning yellow when ripe.

The skin of the melon is smooth and thin. Before ripening the greater bulk of the latex lies just under this skin. The flesh of the green fruit is white, tough and watery. As the fruit ripens it turns to a muskmelon yellow, with a thickness of about 1½ inches, ending in a central cavity which is filled with seeds attached to and held together with a delicate membrane, which constitutes the inner skin of the fruit.

The seeds when fresh are dark brown, changing to black on drying. Before desiccation their outer membranous coating is transparent and slippery; the inner coating is hard, horny and wrinkled, and between these two coatings lies a mucilaginous substance containing myrosin. Within the inner shell lies the leaf-like cotyledons, veined at the base with an albuminous homotropal embryo with a roundish radicle easily distinguished when slightly magnified.

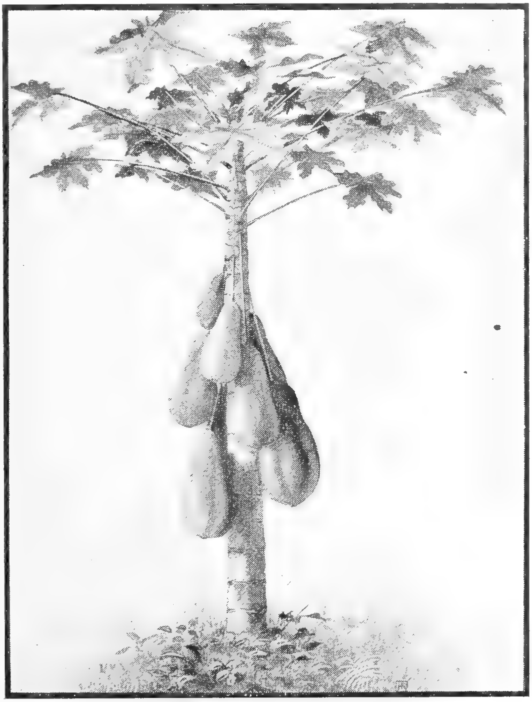
The seeds when dried resemble pepper. They are aromatic, pungent, piquant but not as sharp as mustard, their taste slightly suggesting water-cress.

CULTIVATION AND GROWTH.

It is quite common for numerous papaw plants to spring up from seeds scattered by the birds over a portion of land which, accord-

ing to tropical custom, has been cleared by burning away the trees and undergrowth. There are no forests of papaws because the plants need sun and room. They are seldom seen among dense growths. They do not progagate in clusters. For the most part they are the product of cultivation, and near every hut are carefully guarded groups from two to six in number.[5]

They present a striking appearance with their straight slim, shiny stalk; their bright green umbrella tops towering above a



"Hanging Papaw."

wilderness of flower-sprinkled verdure. Most beautiful specimens are seen in such a place, their base covered with a tangled undergrowth of trailing, climbing vines. Their roots are kept moist by fallen leaves; and enriched by nuts and fruits that fall and rot among the masses of forage and litter so abundant in tropical gardens.

[5] This has particular reference to the habits of the *Carica Papaya.* Certain varieties such as the *Carica quercifolia, C. microcarpa,* etc., are sometimes found in the dense forests.

The only cultivation they can possibly receive must come from a little house waste promiscuously thrown from the hut, the browsing of the ever present dogs, asses and goats. But under these conditions fruiting is generally abundant. They exhibit somewhat the characteristics of the melon tribe. The young plants are exceedingly sensitive and tender; under slight adverse conditions they succumb and die.[6]

A place where it never rains but always pours seems best suited to the papaw. My records show the most thrifty trees in spots where it rains nearly every day in the year; pouring, soaking rains with a fierce, bright sun shining all through the downpour. After the rain come the insects, lizards, centipedes and other creeping things that delve among the roots and climb up the stalk of the papaw and do the real cultivation. The plant will not flourish in swampy nor sandy soil, and seems to be at its best in the rich humus of the hillside.[7]

It grows at the edge of the sea with the waves washing the roots, luxuriates in the high mountain plateaus in all of the windward and leeward islands; it flourishes but does not attain to any great

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[6] Professor Rusby ("Carica Papaya," *Druggists' Bulletin*) has stated that this tree "can be propagated and grown with great readiness; that its vitality is so great that it is with difficulty destroyed until its natural course has been run." Six years' observation has convinced me that it is exceedingly difficult of cultivation, and that the cultivated trees are most easily destroyed by adverse conditions.

[7] The following is an incomplete analysis of a plot in Jamaica on which were several fine specimens of the papaw:

Water (in air-dry sample)	5·02
Volatile matter	20·12
Silica	32·72
Lime (as oxide)	10·62
Magnesia (oxide)	1·00
Potash (oxide)	·52
Sodium, trace	
Magnesia, trace	
Aluminum (and iron)	8·64
Carbonates $(CO)_2$	5·81
Phosphoric acid	10·20
Sulphates, trace	

[8] In Venezuela thrifty specimens are cultivated in the sandy soil of the ravines. There is here, however, a rainfall averaging one metre per annum and the climate is very equable.

height, on the bare coral rocks of Yucatan. In parts of Peru it grows prolifically without much cultivation or care, and it is reported that in the Transandine regions it reaches a height of over one hundred feet.

In some localities the plant begins to grow fruit in seven months; in others, eighteen to twenty months from the seed. Usually its life is rather short, two to three years being the maximum fruit-bearing period. (A rare specimen was observed which was eighteen years old, and was bearing one to two fruits each year.) The fruiting of the papaw is abundant. From two to three hundred have been gathered in a season from a wild tree, in size varying from an inch in diameter to that of a baseball. The cultivated plants yield from twelve to sixty fruits, weighing from five to twenty pounds each.[9]

It is reported that in Brazil, in the French Colonies, in Algiers, and in the Island of Reunion, successful and extensive cultivations have been carried on. In the island of Montserrat a large acreage under cultivation was some three years ago destroyed by a tornado. In the island of Jamaica, under government patronage and the immediate direction of William Fawcett, director of the botanical gardens, several attempts at the cultivation of this plant were undertaken on a large scale, but the results were not encouraging. Plots consisting of five acres in the first instance and ten acres in the second were prepared by clearing, seeds were carefully selected, one portion of the seed being sown directly in the ground, other portions sown in bamboo pots, and the young plants transplanted. In the first instance, a rather fair proportion of the trees came to maturity and began fruiting, but at this stage disease set in, insects attacked the plants and the whole field was exterminated. The wild plants do not seem to be attacked by disease except after injury, but the

[9] The best method of planting papaws is to raise the young plants in beds and as soon as they are three inches high transplant them into bamboo joints, in which they can be kept until they are 9 inches high, when they can be transplanted to the open ground. In dry districts they will require abundant watering, irrigation twice or thrice a week being absolutely necessary. In wet places they can be grown with little or no water. Papaws require good, rich, deep soil and good cultivation; even then, many of the plants, just as they should commence to bear, suddenly fail, the plants cease to grow, the young leaves turn yellow and fall off.—(Wm. Fawcett, Bulletin Botanical Department, Jamaica.)

cultivated plants seem very susceptible to every sort of malady. Insects attack the tender leaves of the young plants and they wither. Fungi and bacteria find here a suitable soil.

After fruiting, and especially if the fruits are bled, the tree will take on a general debility and become the prey of every adverse circumstance. One large field was entirely eradicated by a disease or diseases which the natives attributed to attacks of the "mackacka worm."[10] In my opinion, the trouble arose from the inherent weakness of the cultivated plant in its altered environment, which rendered it susceptible to attacks of beetles and insects of various kinds.

In another series of plantings conducted with still more careful preparation of the ground and selection of seeds, coupled with care for the young plants, there was a record of a small proportion of plants coming to maturity, and of these only a meagre part bore fruit. None of the plants or their fruits were as large as those of the parent stock. All of these efforts were accompanied by phases which were puzzling and embarrassing.

The variations in plant life which one sees and hears of in these regions are somewhat interesting. It is stated that the shaddock contains thirty-two seeds, only two of which will produce shaddocks; the remaining thirty will yield sweet oranges, bitter oranges, forbidden fruit, good oranges and bad oranges, and until the trees are in full bearing no one can guess what the harvest will be. The seeds of the mango selected from the finest fruit and cultivated with care, will rarely produce anything approaching the parent stock. In fact, no two trees of the mango seem to resemble each other. The papaw is likewise very prone to variation. Seeds selected with extreme care from flourishing trees, the fruit of which would weigh fifteen pounds, upon being planted would in part follow the parent stock; other portions would revert to the wild prototype and yield fruit the size of a hen's egg.

In some of the fruits of the papaw the seeds number five, in others prodigal nature supplies over five hundred, apparently only a few of these seeds are fertile. When a native desires a single

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[10] The term "mackacka worm" in the tropics is applied to the larvæ of various beetles which feed upon plants that are undergoing decay. I suppose that plants already diseased were the only ones affected, and that the ravages of these larvæ hastened decay. At the present writing these larvæ are reported as doing great injury to the logwood trees.

tree, he buries two or three such fruits in the ground, and at most two or three plants are the result. After continued experiment it was found that seeds taken from the central portion of the largest and finest fruits were the most likely to be fertile, and would give more encouraging results. The proper adjustment of the sexes in tropical soil is difficult and exasperating.

The papaw is much like the nutmeg in its vagaries of sex relation. It is generally agreed that for fertilization one male to ten female plants is the proper ratio, but until the trees arrive at the blossoming stage (five years in the case of the nutmeg) the male cannot be distinguished from the female. One can imagine the dismay of the cultivator who finds at the end of all his toil and waiting that he has a plantation of male non-fruit-bearing instead of the coveted female, or fruit-bearing plants. I have records of numerous instances where acres of ground were planted with thousands of papaw plants in which the males were in the majority of over fifteen to one.

This constantly recurring disproportion of the sexes suggests that in cultivation we were so changing environment as to cause a perversion of the sexes, resulting in a race of non-fruit bearers.

Methods of artificial fertilization and budding, such as is followed in the propagation of melons and oranges, are now in the experimental stage.

(*To be continued.*)

A FEW NOTES ON THE USE OF WOOD ALCOHOL PHARMACEUTICALLY.

BY FREDERICK T. GORDON, PHARMACIST U. S. N.

The point has been raised that one of the objectionable features in the use of wood alcohol pharmaceutically is its strong and peculiar odor, an odor that is unpleasant to many persons and which at once makes the substitution of this for grain alcohol apparent. That this is a drawback is undeniable; therefore the question has been asked if there is anything that can counteract or improve this odor. This is perfectly legitimate to answer, for there are many preparations in which purified wood alcohol can be used, *e. g.* liniments, lotions, toilet preparations, etc., without impropriety, provided that the use thereof is made known to those whom it will most concern,

the druggists, and a reasonable reduction in price is made. Any effort to prepare a wood alcohol that can be used surreptitiously in place of grain alcohol should be sternly frowned down; if it is to be used—and I hope to see it in its proper place among pharmaceutical solvents—this use must be open and above board, sanctioned by the weight of authority unimpeachable.

As far as I have been able to learn from study of the literature on the subject as found in our drug journals, there is but one way to get rid of the peculiar odor of wood alcohol and that is to eliminate the impurities that give it this odor. The addition of many essential oils and substances possessing a powerful odor will, to some extent, mask the odor of wood alcohol, but they will not mask it so that the trained nose cannot detect it, and, from some experiments I have made, I would say in addition that it is a waste of these oils even to try to hide that peculiar "methylated" odor; it will come out. The odor of wood alcohol is not due to the methyl alcohol it contains, but is due to its impurities—acetone, furfurol, methyl acetate, allyl and amyl alcohols, aldehyde, etc.—and when these are thoroughly removed we get a spirit that can scarce be distinguished from a pure grain spirit, one admirably adapted for use in making the cheaper perfumes. The process of removal is mainly chemical treatment and fractional distillation; it is profitable only on a large scale. Such a "pure" wood alcohol, or, as it is then better named, pure methyl alcohol, can now be easily obtained.

In making a number of solid extracts of some of the narcotic drugs with methyl alcohol, in which the menstruum was strong in alcohol, I made the observation that such solid extracts seemed to be more brittle and easier to powder than when made with grain alcohol, and it also seemed to me that these extracts were freer from inert extractive than the latter. This is a point that invites further investigation, especially so as it has been proven that methyl alcohol will extract the active principle of these drugs equally as well as does grain alcohol. In my work, such extracts assayed well up in alkaloidal strength, and proved easier of assay, too, from being freer from extractive matter.

Wood alcohol has been suggested for making tincture of iodine—this should be positively prohibited, as such a tincture is violently irritating, decidedly caustic in effect and will blister or cause an eruption on tender skins. When used around the face or neck, its

vapor causes great irritation of the eyes and nose—almost unbearable, and also makes the exposed skin smart and tingle. Even pure methyl alcohol tincture will cause irritation of the nose if its vapor is inhaled, an irritation quite different from that of iodine. During the winter I made a number of experiments on wood alcohol tincture iodine, having a number of cases under my observation where the chest was painted with iodine for simple cough and cold, painting one side of the chest with wood alcohol tincture, the other with grain alcohol tincture. In every case the difference was marked, the wood alcohol side appeared much redder the second day, there was sometimes faint blistering, and the patients declared that this side "burnt" them the most. In applying this there was often caused very unpleasant symptoms from the irritating effect of the vapor on the eyes and nose, one case of mild conjuctivitis being noted. In a severe case a blistering effect was wanted; this was obtained easily by painting the wood alcohol tincture on thickly and covering it with a piece of oiled muslin. The burning pain became so great in ten or fifteen minutes that the muslin had to be taken off and vaseline applied. From this experience I would say that the wood alcohol tincture of iodine is only fitted for veterinary practice, or for cases in which strong irritating effects are called for, and I might add that in general the effects of this tincture were distinctively less satisfactory in my cases than the U.S.P. tincture.

Noting that the peculiar irritating effects seemed to come from the vapor of the wood alcohol tincture, I sought the reason for this, and I think it lies in the formaldehyde and formic acid formed in this tincture by the action of iodine on wood alcohol, or some of its impurities; for the tincture made with pure methyl alcohol yielded much less pronounced results. One hundred c.c. of tincture were made, U.S.P. strength, and allowed to stand ten days, to get as much action by the iodine as possible; this was then distilled in fractions of 10 c.c. and each of these examined. The distillation began at 66° C., running up to 68° for the last four fractions. The first fraction was of a light straw color, contained a trace of iodine, reduced silver solutions at once and gave marked reactions for formaldehyde and formic acid. To make sure of the former, a number of tests were applied to the distillate—all gave very positive reactions. I did not then estimate the amount of formaldehyde formed from given quantities of each of the substances, but this I

hope to do soon, as I have a tincture I am keeping for several months, distilling off fractions monthly. The first four of the fractions contained practically all of the formaldehyde and formic acid; the amount of iodine in each increased progressively, the last two fractions being very dark in color, the tenth fraction not being distilled over.

A curious behavior of the first two fractions seems worthy of mention. As I remarked, these were light straw color No. 1, and pale yellow, No. 2; when exposed to the direct rays of the sun in tightly corked vials they became colorless in an hour or so; left standing uncorked over night, the color returned. This experiment was repeated several times, the color gradually fading until now, a couple of months later, the two samples are water-white and do not react for free iodine. Both still give the formaldehyde reaction p ainly.

Another point. Although there is a small difference in the specific gravities of wood and grain alcohol, the two tinctures I made had practically the same specific gravity, the difference in the appearance of the two tinctures would lead one to think that there is at least ten or fifteen points between them. The wood alcohol tincture seemed very thin—" watery " is a term that somewhat describes it—and has very little " body," it is more limpid and spreads on the skin with great rapidity. Its color, too, is different; it has more of a greenish-yellow tint in thin layers than the mahogany brown of the grain alcohol tincture, and is more transparent. One who has seen both tinctures could readily detect the wood alcohol tincture by its general appearance alone. However, if a pure methyl alcohol is used, there is very little difference between it and the U.S.P. tincture in general appearance; neither is it much more irritating, either to the skin or in its vapor. No doubt the great difference is due to the many impurities mentioned as being present in wood alcohol. Referring back to specific gravities, the specific gravity of my wood alcohol tincture iodine was 0·877 to 0·875 for grain alcohol tincture.

Pure methyl alcohol seems to be well adapted for the making of resins from crude drugs; its lesser cost would be a great advantage to the pharmacist if its use were made permissible. I made a few experiments in this line with podophyllin and jalap, and would report that I got results every bit as good in yield, appearance

and activity from methyl alcohol as I did with grain alcohol in a series of parallel exhaustions; indeed, the resins so obtained could not be told from one another. In fact, I think the question of permitting the use of *pure* methyl alcohol for such operations, the making of solid extracts and similar preparations in which the solvent is completely removed from the finished article, to be well worthy of thought and study by our Pharmacopœial Revision Committee, for such use would greatly cheapen the cost of many drugs without impairing their efficiency at all.

METHYL ALCOHOL IN PHARMACEUTICAL PREPARATIONS.

By E. Fullerton Cook.

The question recently raised concerning the justifiable use of methyl alcohol in preparations for internal or external use has been prominently brought before the manufacturer and pharmacist and it is desirable that some conclusion be reached.

At the request of Professor Kraemer some of the more recently published journals, those of 1901, have been reviewed for reports in favor or disfavor of its use, and abstracts are submitted from those which add to the literature on the subject.

The communication from Mr. Frederick T. Gordon, published in the *American Druggist*, of February 25, 1901, is prominent among those in favor.

In almost none of the unfavorable criticisms does there seem to be a discrimination in the use of the terms "wood alcohol" and "purified methyl alcohol," and this is unfortunate, as Mr. Gordon has said, since the commercial wood alcohol cannot, at any time, be considered a rival of ethyl alcohol in preparing pharmaceutical preparations.

We must, however, accept all evidence obtainable, and carefully determine its value, and with that end in view the following are presented:

Dr. A. G. Thompson (*Pharmaceutical Review*, Feb., 1901, 51), as early as 1897, reports an instance which came under his observation, of complete blindness caused by the drinking of an essence of ginger.

During 1898–1899, Kuhnt, MacCoy and Michael, Moulton, Holden, Gifford, Patillo, Callan and others report cases of blindness from the drinking of "methyl alcohol."

In February, 1899, Hiram Wood reports in the *Ophthalmic Record*, six cases of total blindness caused by the substitution of an essence of ginger for other alcoholic drinks.

As long ago as June, 1877, Viger published an account of a similar case in *l'Année Medicale*.

The symptoms of a typical case are as follows: about an hour after drinking severe headache, vomiting, excessive sweating, dilation of pupils and delirium.

In twenty-four hours the delirium and other symptoms have disappeared but total blindness remains.

The sight gradually improves during the next two months, but eventually permanent loss of sight results.

A large dose of wood alcohol taken upon an empty stomach has been known to cause death after several hours, while complete recovery has been reported when but a small dose was taken.

On March 6th, at Crisfield, Maryland, a man, after drinking a large quantity of an essence of ginger, was taken violently ill and, though given careful treatment in a Baltimore hospital, subsequently became entirely blind.

On April 19, 1900, a man at Circleville, West Virginia, drank some essence of peppermint and essence of lemon in lieu of whiskey or brandy. Although experiencing almost total blindness during the next few days, his sight gradually grew better.

On September 6th, at Fawn Grove, York County, Pa., the drinking of some essence of ginger resulted in the death of two men and total blindness of another.

The essences causing the trouble in these last mentioned places, Crisfield, Md., Circleville, W. Va., and Fawn Grove, Pa., were all manufactured by one firm and, samples having been obtained, they were subjected to analysis, the results being published by H. P. Hynson and H. A. Brown Dunning in the *Pharmaceutical Review* of February, 1901, p. 54.

They obtained a distillate of the samples and made comparative tests with a mixture containing 75 per cent. Columbian spirits and 25 per cent. ethylic alcohol, which led them to conclude, that the distillate was a similar mixture.

In the communication above mentioned they say: "We believe that the results secured are such as to convince almost any one that wood alcohol is present in large quantities in the essence of ginger examined. It must also be concluded, since the tincture of ginger made with ethylic alcohol has never produced the toxic and sight-destroying effects described by Dr. Harlan, that methylic alcohol is entirely unfit for internal administration."

In the *Bulletin of Pharmacy*, of March, 1901, page 96, an instance is reported of a party of four men having indulged in the drinking of some essence of ginger that resulted in the death of two, and only the most active efforts on the part of the physicians saved the other lives.

The *Druggists' Circular*, of March, 1901, reported another case in which a sailor, during "shore leave," drank a quantity of essence of ginger. He experienced the symptoms before mentioned, followed by permanent blindness.

The instance cited by Drs. MacCoy and Michael, several years ago, was that of a young man who, while convalescing from measles, succeeded in obtaining two ounces of methyl alcohol, "the article being a highly purified one." Two hours afterwards he took a similar quantity and as a result experienced the usual, immediate symptoms and eventually almost total blindness.

In the same article, in commenting upon these cases they say, "There can be no reasonable doubt that all the people mentioned above were simply poisoned by wood alcohol; as in addition to the finding of that substance in the ginger preparations, it is shown that the same result followed the use of a peppermint essence in which it was also detected." * * * Whether the wood alcohol used in making the preparations which have brought about such dire results was "crude" or "purified" is apparently unknown. It is reasonable to infer, however, that anyone employing it for such purposes would choose the latter on account of its comparative freedom from disagreeable odor. * * * The foregoing should sufficiently dispose of all theorizing as to the possible harmlessness of a purified wood alcohol. Even if it were known that it could be so purified as to render it no more harmful than grain alcohol, one would have to remember that there would always be uncertainty as to its purification having been fully accomplished. With ordinary alcohol we have no parallel risk."

In answering a query in the *Pharmaceutical Era*, April 11, 1901, page 393, "May wood alcohol be used as a preservative for witch hazel?" they say that the manufacturers of Columbian spirits state in their advertisements that it cannot be used internally.

In connection with this, the attention of all who may be interested in this subject should be called to an article published by Ferdinand A. Sieker on "The detection of methyl alcohol in pharmaceutical preparations," appearing in the *Pharmaceutical Review* of March, 1901, and other journals.

It is interesting to note that, according to Mr. J. Wolff, in a paper reported at a recent meeting of the Paris Académie, distinct traces of methyl alcohol are found in the fermented juices of many fruits, amounting to as much in some instances as two (2) volumes for every one hundred (100) of ethylic alcohol formed and in other fruits only 0·2 volumes to the same quantity of ethyl alcohol. See *Compt. rend.*, 1900, p. 1323. *Zeitschr. f. Unters. d. Nahr. u. Genuss.*, 1901, p. 391.

It will be noticed that we have no reports on the use of methyl alcohol as a menstruum in the making of such preparations as those in which the final product contains none of the solvent, although, as Mr. Gordon says, the various manufacturers could, no doubt, furnish some very interesting, possibly conclusive evidence, if they would but report their experiences; neither do we have any report upon its use in the making of toilet preparations, although one man vigorously protests against the very thought of its use in this connection. He evidently is familiar with the commercial grade only and not the "exceptionally pure and odorless article."

Likewise there is almost no mention of its use in preparations intended for external application.

In view of the facts above cited it is claimed that pharmacists at present are not justified in substituting methyl alcohol for grain alcohol when the preparation is intended for internal administration. For heating purposes it may well take the place of the more expensive liquids, also as a solvent in the preparing of solutions to be used in the arts, as varnishes, etc., and seemingly without objection in the making of pharmaceutical preparations in such cases where none of the methyl alcohol remains in the finished product.

AN INVESTIGATION OF COLCHICUM.[1]

By Louis Schulze.

Query 15.—"Colchicum root and seed both contain as their principle colchicine an alkaloid. Why should both be official, and which is preferable, and for what reasons?"

If colchicum depends upon the alkaloid colchicine for its therapeutic value, then, it seems, only that portion of the plant containing the largest amount of this alkaloid should be official, and all galenical preparations be made from that portion.

Colchicine differs from most alkaloids in the following particulars:

(1) It is removed from acid solutions by shaking with chloroform.

(2) It is quite freely soluble in water.

(3) It is precipitated by Mayer's reagent only from strongly acid solutions.

This alkaloid is, furthermore, very easily decomposed, its aqueous solutions rapidly losing strength, even when quite neutral. Mineral acids, even quite dilute, decompose it on application of heat.

In assaying the root and seed for ascertaining the percentage of colchicine three methods were pursued, namely:

First Method.—100 grammes of the powdered drug were placed in a flask, and 100 c.c. of Prollius' mixture added. After securely corking, this was macerated, with occasional shaking, for twelve hours. After decanting 50 c.c. of the clear fluid, it was evaporated on a water-bath in a beaker nearly to dryness. The residue was taken up until 10 c.c. of ether and 5 c.c. sulphuric acid (2·5 per cent.) added and stirred until the ether was evaporated. The acid fluid was then filtered into a separator, retaining the insoluble residue as much as possible in the beaker. This residue was redissolved in a little ether, and 2 c.c. of the dilute acid added, stirring as before, and filtering the acid aqueous solution into the separator. After washing the filter with a little of the acid, the washings were added to the contents of the separator and 15 c.c. of chloroform shaken carefully with it during two minutes. It was then allowed to separate and the chloroform drawn off into a tared beaker. This treatment was continued with two portions of fresh chloroform (10 c.c. being used

[1] Eighteenth Annual Proceedings of the Maryland Pharmaceutical Association, June, 1900, p. 119.

each time). The aqueous solution remaining after evaporating the chloroform was tested with Mayer's reagent, one-half strength solution being used, and in case of seed, on discovering the alkaloid had not been entirely removed, again treated with chloroform. Finally the chloroformic solutions were evaporated to dryness, redissolved in a little dilute alcohol and again dried to a constant weight. This residue was nearly pure colchicine. As it might have retained some chloroform, it was once more dissolved in dilute alcohol and dried.

Second Method.—10 c.c. of fluid extract was diluted with 85 c.c. of water, and solution of lead subacetate added in slight excess (*i. e.*, until the fluid had a distinctly sweetish taste). This was made up to exactly 100 c.c. with water and filtered. After adding sodium phosphate in powdered form, sufficient to throw down the excess of lead, and once more filtering, 50 c.c. of the filtrate were put into a separator and shaken out with three portions of chloroform, dried and weighed, as in the first method.

Third Method.—After removing the lead by means of sodium phosphate, as in the preceding method, the alkaloid was precipitated by tannic acid, the liquid filtered off, the tannate washed and digested with lead oxide, this dried and the alkaloid dissolved out by means of alcohol, filtered. The filtrate again dried and weighed.

The result in each instance was as follows:

	Seed. Per Cent.	Root. Per Cent.
First method	0·9	0·6
Second method	0·6	0·4
Third method	0·4	0·4

Making for the seed an average of between 0·6 per cent. and 0·7 per cent.; for the root between 0·4 per cent. and 0·5 per cent. Therefore, it appears the seed are slightly richer in colchicine than the root, and should there be no other valid reason why the root should be retained in the Pharmacopœia, they would be sufficient whenever the effects of this drug are desired.

PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.—The twenty-fourth annual meeting will be held at Hotel Oneonta, Harvey's Lake (near Wilkes-Barre), Pa., on June 18–20, 1901. Address the Secretary, J. A. Miller, Harrisburg, for orders for railroad excursion tickets.

CORRESPONDENCE.[1]

PROCTER MEMORIAL.

In response to a letter from the Editor of this JOURNAL concerning the feasibility of establishing a Research Laboratory as a memorial to the life and work of Prof. William Procter, Jr., by the American Pharmaceutical Association at its semi-centennial in 1902, the following are some of the replies which have been received:

DEAR SIR:—That a monument to the memory of Prof. Wm. Procter will be erected is now a practically established fact, judging from the letters that have appeared in the recent numbers of the AMERICAN JOURNAL OF PHARMACY, and the question remaining is to determine what form this memorial shall take.

The statue, the medal, the scholarship, the research laboratory, each has its advantages and its disadvantages. Of the four, it seems to me that the statue is the least desirable. In perpetuating the memory of such a man as Procter we want a *living* monument, something that will be ever before the minds of the pharmacists of to-day and of the future, something to stimulate us to do better work. If a statue be erected and placed in Washington, but a small percentage of pharmacists will ever hear of it again after its unveiling. Those who visit Washington may see it, but in that city of sights not more than one in a thousand would be sufficiently impressed to make him return home resolved to do more for the advancement of pharmacy.

The medal, granted once in three or five years so that it will not become too common, would undoubtedly stimulate quite a number, but it seems to me even then there would be a decided restriction in the amount of good accomplished.

The scholarship granted every year would help a larger number of men; but probably most of them to whom it would be given would be recent graduates, frequently young men not fully matured and consequently not equipped to produce the best results.

The research laboratory, if it can be properly equipped, manned and maintained (giving due weight to that "if"), would be the ideal memorial. It would be as lasting as the statue and far more impressive. The results of the labor done there would not appear only once in three or five years, but every year and several times a year, and it

[1] For other information and correspondence on this subject, see editorials, November, 1900, and February, March, April and May issues of this JOURNAL.

would not be the work of more or less immature men, but that of men who have already learned to work to the best advantage. Dr. Lyons' suggestions seem particularly good. If we could bring about such a condition of things, so that by law, or better, by public opinion, all medicinal substances to be deemed worthy of recognition by physicians must come up to the standard set by the laboratory, we would have done much for pharmacy. Make the stamp of the laboratory of sufficient value, so that manufacturers will be glad to have it on their goods, and those who are now putting out inferior articles, not bearing the stamp of the laboratory, would be stigmatized or driven from competition. This would, of course, be only a part of the work of the laboratory. Original investigations along practical lines should receive equal attention.

NASHVILLE, TENN. EDSEL A. RUDDIMAN.

DEAR SIR:—Replying to your recent favor; there is no question but what a pharmaceutical research laboratory under proper control and direction, whose work should be restricted to supplying data for the Committee of Revision of the Pharmacopœia and for working out improved formulas and methods of manipulation for semi-official products such as are included in the National Formulary, might be of great value to the profession of pharmacy and add very largely to the reputation of American Pharmacy as compared with its past record.

To be of value a strong committee should be selected, consisting of chairman and able members of the Committee of Revision of the Pharmacopœia, the President, Permanent Secretary, Chairman of the scientific section and of the dispensing section of the American Pharmaceutical Association, and all work done should first have the sanction of this body.

It would seem that the establishment of such a laboratory in connection with some government institution at Washington, as the laboratory of the Department of Agriculture, would be more economical and advantageous than to equip and conduct an entirely independent institution. If all the expenses were borne, it might be feasible to make some such arrangement and it might not.

BOSTON, MASS. E. L. PATCH.

DEAR SIR:—Replying to your request for further comments on the proposed Procter Memorial, I will say that a careful reading of

the suggestions made in the February, March and April editions of the JOURNAL leaves me still of my original opinion—that the best memorial that can be devised will be a research laboratory in the city of Washington. Of course such would be a large undertaking, but by no means as expensive as some predict. The $200,000 plant suggested by one of your contributors would be magnificent, but its magnificence would be chiefly in the direction of extravagance. Twenty to thirty thousand dollars would suffice, and beyond that sum expenditure is hardly necessary. A stately palace of marble with superb equipment would be expensive, I grant; but do we plain pharmacists need such a structure? Would the plain Quaker whom we wish to honor desire such a monument? No! Let us aim at something simple; let our motto be "Deeds rather than dazzle;" let the Procter Memorial Laboratory become known by the achievements of its workers rather than by the gorgeousness of its façade. President Garfield's famous saying relating to the teaching capacity of Mark Hopkins, his statement that a log cabin and a bench with his revered teacher at one end and the student at the other, was preferable to a college with magnificent equipment and poor teachers, is justly applicable in the present case.

Surely, it were an infinitely better monument to Procter to have a modest building and equipment with zealous workers, than a massive pile with nothing done.

Let a similar case be cited: The Lloyd Library is, or should be, the pride of American pharmacy. Its complete equipment is a positive joy to all engaged in research work, and its fame has gone forth to the furthermost parts of the pharmaceutical world. What matters it that it is housed in a modest building, with naught but a little tablet announcing its purpose. Its fame comes from its usefulness, not from its personal appearance.

Therefore my idea is that a research laboratory should be started, even though only $15,000 were raised. Let a modest house be purchased in Washington, and equipped for pharmacopœial research work. If the work emanating from the institution is valuable, it will surely grow to greater things, and (as a judicious investment in Washington realty rarely depreciates) as further funds are forthcoming, the first modest home might be sold and a more pretentious plant erected. For, let it be said in passing, the writer does not urge a cheap monument to the "Father of Ameri-

can Pharmacy," he merely deprecates efforts to discourage modest beginnings.

CLEVELAND, O. H. V. ARNY.

DEAR SIR:—I am heartily in sympathy with the movement to establish a suitable memorial to Professor Procter. After reading the various ideas expressed in the A.J.Ph., I have slightly modified the opinion which I had first formed.

If it were possible to raise sufficient funds for the proper equipment and maintenance of a research laboratory my ideal would be accomplished. As I doubt very much that this can be carried into effect my second choice would be a fellowship. In case this would not be feasible then a Procter medal to be bestowed only once in two or three years for continuous, exceptionally meritorious work along pharmaceutical lines is the least, in my judgment, that should be decided upon.

ANN ARBOR, MICH. J. O. SCHLOTTERBECK.

DEAR SIR:—In reply to yours of the 4th inst., I desire to say that I am in entire accord with the research laboratory idea, providing the project can be carried out in an adequate and generous way. This it seemed to me at first not easily possible, but if the indications now point to a greater probability of accomplishment, the movement would have my fullest support. There ought to be a liberal endowment for maintenance or some other arrangement that would from the beginning remove the need of that practice of economy that is never fruitful.

I will be glad to do what I can to help the matter along.

MINNEAPOLIS, MINN. FREDERICK J. WULLING.

DEAR SIR:—Your favor of the 4th inst. to hand and noted. I am decidedly in favor of establishing a research laboratory as a memorial to Professor Procter, and think it decidedly the most suitable and desirable memorial we could erect to him. But I fear it will be too great an undertaking, and that the maintenance of it will be more than the A.Ph.A. can finance. The first expense will perhaps be too large for practical purposes even, for I cannot see where the funds will come from. The fixed charges after it is erected then will be in excess of what it can earn in my judgment, and we cannot depend or look with any assurance upon governmental support or maintenance. If it is located in New York City,

it may earn more from the many importers, who may avail of its facilities, than it would if located at Washington, but in any event I fear it cannot be successfully carried out by the A.Ph.A. The erection of the Hoffmann Haus in Berlin required great and long-continued efforts on the part of the chemists and chemical industries of the world, and we cannot hope to enlist the interest of nearly so many people, nor nearly so many large and wealthy industries. While hence I would prefer to see a research laboratory be the memorial for Professor Procter, I think the most that the A.Ph.A. can hope to successfully carry out is a gold memorial medal to be awarded annually to the pharmaceutical chemist or botanist that has in the judgment of a suitable committee advanced the science the most during the year.

BALTIMORE, MD. A. R. L. DOHME.

RECENT LITERATURE RELATING TO PHARMACY.

THE DISTILLATION PRODUCTS OF CASTOR OIL.

It has been often noticed that toward the end of the distillation of castor oil, the residue in the retort very suddenly and with development of considerable gas is converted into a sticky rubber-like mass. H. Thoms and G. Fendler (*Arch. Ph.*, 1901, 1) report examination of the residue, which they find consists largely of the glyceride of a dibasic fatty acid, triundecylenic acid $(C_{11}H_{20}O_2)_3$.

From this glycerine the anhydride of the acid was isolated in the form of a bright yellow, somewhat elastic mass, having the formula $C_{33}H_{58}O_5$ which corresponds to the composition $(C_{11}H_{20}O_2)_3-H_2O)$. The residue on heating with potassa yielded a new acid of the oleic acid series, a body melting at 36° and of formula $C_{16}H_{30}O_2$.

H. V. ARNY.

CONCERNING OIL GLANDS.

An important contribution to the study of plant processes is an article with above title by A. Tschirch and O. Tunman (*Arch. Ph.*, 1901, 7.)

The special subject investigated was the method of secretion of resins, or of oils, or of gums in the various glands or secretion cells, the work being performed by aid of microscope and appropriate stains. Among the latter the Unverdorben-Franchimont reagent,

(copper acetate 1 part, water 20 parts) is given the preference, it staining resins from blue to emerald green, according to botanical origin. Passing over the individual peculiarities of each resin and oil-bearing plant examined, we find the following important conclusions:

First: In no case were volatile oils and resins found in the secretion cells, bordering the intercellular spaces of the stems, the contents of such cells being either of fat or of tannin. Ethereal oil is invariably found in subcuticular spaces (hence in glands), where it evidently originates, being decomposition product of the cell wall rather than of the cell contents.

Second: Wherever resin is found, mucilage accompanies it; the walls of resin glands invariably having a mucilaginous layer in which, according to the writer, the resin is manufactured; in other words, the layer which Tschirch calls "resinogenous" (resinogene schicht) is invariably mucilaginous.

Third: As yet the exact chemical processes involved in the origin of resins and oils is unknown.

Fourth: It is observed that while tannin accompanies the resins in most glands, it is found more abundant in old glands than in young ones. This fact could be construed either as favoring or disproving the theory that tannin is an intermediate stage in the formation of resins. The writers lean toward the affirmative opinion, explaining the deficiency of tannin in the young cells by saying that it is all used up in the process of transformation into resin and that when the glands become older and the resin formation ceases, the unused tannin is stored up without change. H. V. A.

CONCERNING CATHA EDULIS.

This plant, a native of Abyssinia and Arabia, where it is called Kat and where its leaves have been used from the earliest times by the natives of that region as an innocent stimulant, such as our coffee and tea, is the subject of a lengthy paper by A. Beiter (*Arch. Ph.*, 1901, 17.) Passing over his pharmacognostical description we find that he obtained from the plant an alkaloid by treating the leaves with chloroform, saturated with ammonia, evaporation of the chloroform, solution in acidulated water, extraction with chloroform and repeated crystallization. The yield was about $\frac{7}{100}$ of one per cent., was in the form of small needles of bitter un-

pleasant taste and with no odor. It gave reactions with the usual alkaloidal precipitants and likewise responded to the common color tests. It possesses alkaline reaction and assayed to the formula $C_{10}H_{18}N_2O$. From the leaves was also obtained an interesting rubber-like product, melting at 120°, dissolving in carbon disulphide and other caoutchouc solvents and also vulcanizing. It analyzed to the formula $C_{10}H_{17}O$. There was also isolated from the leaves considerable tannin, seemingly representative of both the iron green and iron blue classes. Lastly was obtained mannite and an ethereal oil lighter than water, and smelling like tea. The ash of the leaves, 11·59 per cent. consisted of magnesium, calcium, iron, chlorine, sulphates and carbonates.

The seeds of the plant on extraction with petroleum ether yielded 50 per cent. of fixed oil. H. V. A.

CASCARA AND ITS ADULTERANTS.

A form of adulteration of cascara sagrada not likely to be met with in this country is reported from France (E. Perrot, *J. Ph. et Ch.*, 1901, 161). It is the addition of buckthorn bark, and the article deals with the pharmacognosy of the two drugs in the form of powder, the conclusions being that the chief difference between buckthorn and cascara sagrada is that the former never contains sclerotic cells (a characteristic of the latter), and is always of a red-brown color rather than a yellow-brown. H. V. A.

CHEMISTRY OF FRESH KOLA NUTS.

The reason of the superiority of the fresh kola nut over the dried is explained as due to the fact that kola contains an oxidizing ferment which utilizes the oxygen of the air in converting the kola alkaloids as well as the coloring matter into insoluble forms. This is in line with the recent investigation on the so-called oxydases, the careful study of which is certain of explaining many of the causes of deterioration now unknown. Thus, it is stated that the darkening of all fruit on drying, and also the relative inferiority of a dried fruit to a fresh one, is due to the presence of such oxidizing ferments, which produce a chemical change on all fruit exposed to the air. Fresh kola nuts contain a normal and soluble alkaloid, called kolanine, which under the influence of the oxidizing ferment is decomposed or rendered insoluble. Sugar, however, prevents such

deterioration, hence it is highly advisable to dispense the kola in the fresh form, either as a saccharine, fruit pulp, as a syrup, or as an elixir. As to the so-called kola red, there is much confusion concerning this product, at least three distinct bodies bearing this name, and all of these are supposed to be pathological products produced by the oxidizing ferment. Hence, the attempt to judge the value of kola nuts by amount of kola red they obtain is characterized as absurd.—(Charles, *Bull. de Sc. Pharmacol.*, 1900, 495, through *Schw. Woch. Ch. u. Ph.*, 1901, 25.) H. V. A.

ACTION OF METALS ON 95 PER CENT. ALCOHOL.

95 per cent. alcohol of neutral reaction and leaving no residue on evaporation was left in contact during six months, placed in bottles of white glass, carefully corked with each of the following metals: Copper, iron, tin, lead, zinc and galvanized iron. At the end of six months the originally clear liquid was found turbid and containing quite a residue other than the metal itself, and the alcohol from each of the metals save copper, yielded on evaporation a decided amount of residue. Unfortunately, the experiment was not a quantitative one; however, it leads to the valuable conclusion that all metals used, with the exception of copper, are partly soluble in alcohol. (Dr. Malmejac, *J. Ph. et Ch.*, 1901, 169). H. V. A.

ESTIMATION OF SUGAR IN URINE.

The administration of methylene-blue obscures the Fehling's test in the urine of the patient. In such cases the urine must first be decolorized by aid of solution of mercuric nitrate; subacetate or acetate of lead not answering the purpose.—(G. Patein, *J. Ph. et Ch.*, 1901, 172.)

A NEW SYNTHESIS OF THE ALCOHOLS.

Treatment of an alcohol with its sodium salts yields an alcohol having twice the number of carbon atoms. Thus inactive amylic alcohol $C_5H_{12}O$ with its sodium derivative, yields an alcohol $C_{10}H_{22}O$. Likewise onanthic alcohol $C_7H_{16}O$ plus its sodium salts yields Beta-dionanthic alcohol $C_{14}H_{30}O$ and the onanthate of sodium. Likewise the dionanthic alcohol heated with the sodium derivative of onanthic alcohol gives trionanthic alcohol $C_{21}H_{44}O$. The two new bodies, dionanthic and trionanthic alcohol, are described in the article.—(M. Guerbet, *J. Ph. et Ch.*, 1901, 179.) H. V. A.

MANNA FROM THE OLIVE TREE.

In the gardens of Mansourah near the Iron Gate of the Danube, there are some very ancient olive trees, the trunks of which yield abundantly of manna, some of the exuding pieces weighing almost a kilo. The product on examination yielded 52 per cent. of mannite, identical with that from the manna ash. The residue consisted of sugar, gummy matter, debris and water.—(J. A. Battandier, *J. Ph. et Ch.*, 1901, 177.) H. V. A.

EDITORIAL.

CHARLES RICE.

Without knowledge that Dr. Charles Rice had been ill, the pharmaceutical world was startled by the announcement of his decease on Monday morning, May 13th, at 10 o'clock, in his apartments at the Bellevue Hospital, New York City. The fact was, he had not been well all winter, and few apprehended even during his last hours that the end was at hand. As recently as May 8th, he had sent out to the members of the Committee of Revision of the U.S.P., several circulars bearing on the work. On Saturday afternoon, May 11th, he went out for a drive in Central Park, but on returning was compelled to go to bed, from which he never arose. As to what was the cause of his death, it is not entirely apparent, it being supposed that he died of aneurism of the aorta. On May 3d he wrote: "It looked at one time as if I had to drop all work not absolutely incumbent upon me, but there is enough improvement visible to justify me holding on at least for a while longer, until it can be seen what the summer will do for me. I first had the grippe, and this was followed by intercostal neuralgia and indications of asthma, which, some weeks ago, became very annoying. But I am getting better, and am only kept back by the unfavorable weather."

Dr. Rice was of Austrian parentage, and was born on October 4, 1841. Of his early life and subsequent career until he came to this country we know little, save that he received a very thorough education in the classics, mathematics and the languages in various schools in Munich, Passau and Vienna. Having been disappointed in obtaining a position requiring a knowledge of Sanskrit under the

British Government, he came, through the influence of an uncle, to America, in 1862. During the war he served in the navy as hospital steward, and had an opportunity of visiting various foreign countries. After his discharge from service he had a spell of illness and was taken to Bellevue Hospital. Meanwhile he was made assistant to John Frey, the apothecary of this institution, and prosecuted his chemical studies so that upon the death of the latter he was made superintendent of and chemist to the general drug department of Bellevue Hospital, and subsequently chemist to the Department of Public Charities and Corrections of New York City, which positions he held during the remainder of his life.

His later life has been so rich in accomplishments that a knowledge of all the details of his early life are not essential to an understanding of his character. His whole life was devoted to high purposes and was so filled, in not only doing his own work, but also in giving aid and counsel to others, that when one approached him there was no time for gossip or idle chat. Indeed, it would not be saying too much that these things were foreign to his nature, and that life had a greater meaning for him than this. It seems almost as though Emerson must have been writing of some such personality as his when he portrays what a friend should be, and says:

> "Why should we desecrate noble and beautiful souls by intruding on them? Why insist on rash personal relations with your friend? Why go to his house or know his mother and brothers and sisters? Why be visited by him at your own? Are these things material to our covenant? Leave this touching and clawing. Let him be to me a spirit—a message, a thought, a sincerity. A glance from him I want, but not news nor pottage. I can get politics and chat and neighborly conveniences from cheaper companions. Should not the society of my friend be to me poetic, pure, universal and great as nature itself? Ought I to feel that our tie is profane in comparison with yonder bar of cloud that sleeps on the horizon, or that clump of waning grass that divides the brook? Let us not vilify, but raise it to that standard. * * * * Worship his superiorities."

Dr. Rice was one whom it will require years to appreciate and understand. He will undoubtedly rank as the superior of all who have labored before him in the profession of pharmacy. "He taught, as the artist must, without intention, and his lesson was how a man may be modest and self-reliant." In reply to a request for a biographical sketch, he sent the following on March 11, 1900:

Concerning your last letter, I want to say now that I beg you to give up the idea of making any sort of display of me in print. The older I get, the more distasteful is this to me. I cannot prevent any one from acting on their own will and judgment, but when I have a chance of giving my views *before* the thing is done, I trust that my wishes will be fulfilled. My life, before I came to this country, passed along in so uneventful a manner that the only landmarks in it that I could point to, are fully covered by the biographical sketch in the *American Druggist* some seven or eight years ago. Since I am here, and since I hold my present position in the Department of Public Charities (now about thirty-four and one-half years) my connection with pharmaceutical journalism and pharmacopœial matters are, I believe, sufficiently well known not to require announcement. Whatever is to be said about me, let it be said after I am gone. Any sort of display about me, particularly now, would be surely taken by some persons as a personal advertisement on the eve of the convention. I am sorry that Dr. ——— has seen fit to put such a puff into ————, yet I cannot blame him, as he did not know how I feel about it.

Hoping that you will drop the idea and comply with my wishes, I remain your sincere friend,

CHARLES RICE.

A close study of the life of Dr. Rice will show that he was pre-eminently a man of character. One could not but see in him the personification of all the noble traits. He, unlike other men, apparently had no chart or compass. He simply acted and lived as seemed best, and what he did was right. He was so unselfish in all his actions that he amazes us, and was with difficulty sometimes understood. In 1885, as Chairman of the Committee on Unofficial Formulas of the American Pharmaceutical Association, he had worked out a plan whereby the New York and Brooklyn Formulary, which he and others in the vicinity of New York had made so successful, was to be turned over—for the sake of the larger field of usefulness and greater good—to become the property of the American Pharmaceutical Association. The discussion on this subject (see Proc., 1885, pp. 558–564 and 574–575) is most interesting reading. The proposition was at first refused, and then through Mr. Ebert the matter was again brought up and Dr. Rice spoke as follows. Those who knew Dr. Rice can doubtless see him and hear him, because the tenor of his remarks on this occasion were characteristic of him on all occasions. He said:

Mr. President:—Certainly, yesterday it appeared to me that there was a peculiar reluctance, to accept the gift freely offered, but I am happy to say that reluctance due to a misunderstanding has been overcome. This may have occurred in reading the report hastily. We had in substance offered you the

following terms: We have asked you to approve of the Formulary, provided you thought it worthy. That was the proposition, or, perhaps, merely a suggestion on the part of the committee. Then the other proposition was put in the form of an invitation from the New York and Brooklyn societies, asking the Association to join in the copyright. We did not insist that you should copyright it; we offered it to you and wanted to help you in the matter of getting the copyright, as we are incorporated. Or if you did not want it copyrighted, and are rich enough to put your hand into your pocket and pay for its publication without insuring to yourselves the exclusive sale of it, you could go ahead and do it. The next proposition was that we ask you—actually ask you—to take all the work that had been done in the preparation of the third edition, which we interrupted in order to make you this offer. We did not ask you to appoint us a committee. As a committee you can appoint anybody else. We are very willing to turn over all our papers to this committee. We knew that some money was required to carry on the experiments, and we suggested that you place some funds at the disposal of the committee. You need not do this if the committee are all rich men and are willing to pay the expense themselves. But you could not expect everybody to do that and serve upon the committee. If this committee is going to correspond with the State pharmaceutical associations in all parts of the United States, to find out what formulas each one desires to have introduced, with a view of making them uniform, there will be some expense. In view of the fact that all the work would cost something, we suggested that you set aside for the use of the committee $250.

It should not be forgotten that a previous committee made an official request of our General Committee to let them have the New York and Brooklyn Formulary, in order to incorporate it in their report to this Association, because they could not get up anything better. We made the reply that we were not authorized at the time to turn over the book; but as the work has now advanced so far in our hands, we concluded to give it to the Association in order to make it national. We sent a representative to Philadelphia to see the Council, and the Council seemed to be satisfied with the offer at that time so far as they understood it; but they decided that they were not authorized to accept it, or to act in the premises, and the advice then given us was to come to the Association. In response to that invitation, we make you a very liberal offer and that is what was given to the Association yesterday. Yesterday the impression on my mind and on the minds of my colleagues was very strong that our offer was supposed to be not quite disinterested, and that for this reason cold water was thrown upon it. I am glad to say that that was a misapprehension. The explanation made a little while ago is satisfactory, and the offer still stands, without any reserve of any kind; and if you are ready to act upon it, we shall be perfectly satisfied.

This was the beginning of the National Formulary, and in its inception, principles and subsequent policies Dr. Rice was the master hand.[1] For most men this would have been a monumental

[1] See Proc. A.Ph.A., 1884, p. 506; 1885, pp. 558, 574; 1886, pp. 159, 177, 191; 1887, p. 496; 1888, first issue of the National Formulary.

work. But even a greater work was done by him on the U. S. Pharmacopœia. To wholly grasp the dilemma and appreciate the position of the pharmacists of the United States in regard to the revision of the Pharmacopœia and the needs of reform, one must consult the Proceedings of the A.Ph.A. for 1876 and 1877.[1] Suffice it to say that in endeavoring to solve the difficulties, one of our foremost pharmacists said of his own plan and efforts (Proc., 1877, p. 531): "The design and plan which was presented to the Association last year has been entirely and, I was going to say, ignominiously defeated. * * * The American Medical Association has distinctly refused to have anything to do with the subject, and now we are in the condition we were in before the broaching of the subject. The subject was entirely mine; brought up entirely by me, originally in the American Medical Association, and so far as I am concerned, it has been entirely defeated and entirely frustrated. * * * The whole subject of the Pharmacopœia seemed to me to require reconstruction and reform, and I undertook that subject with hesitation, but yet earnestly and carefully and with the least possible personality, and proposed a method of reform and a plan for discussion. This soon brought upon me and my propositions an amount of abuse of a character so personal and so intemperate as to be extremely disagreeable, and therefore, I am now ready to leave the matter and turn my attention to something better than setting up for a reformer, even though still convinced of the necessity of the reform."

It was under these circumstances that Dr. Rice was asked to serve as chairman on the Special Committee of the A.Ph.A. on Revision of the U.S.P. In the following year he organized the committee, distributed the work among members and others, and was ready to report at the meeting in 1878 (see Proc., p. 668) a developed and successful plan. The work completely broke down his health, and he asked to be relieved therefrom. This was done, and it was then that Professor Maisch said (see Proc., p. 879) that "it is principally due to that energy and wonderful talent of organizing possessed by Mr. Rice that it [the work on the Pharmacopœia.—Ed.] has reached its present advancement." In closing his report, Dr. Rice said, in his customary manner: "The chairman is grateful

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[1] See Proc. A.Ph.A., 1876, pp. 629–650; 1877, pp. 531–539, 552–557.

for the honor conferred upon him, as well as for the expressions of encouragement which he has received during the past year; but it should be borne in mind that all the advance thus far made is primarily due to the able and earnest workers who are members of the committee, or who have assisted the committee in its labors." Notwithstanding his modesty, Professor Maisch at that time showed upon whom the honor should be placed, and for twenty years the pharmaceutical and medical professions have recognized that it was the character and intellect, the mind and heart of Charles Rice that pre-eminently made the U.S.P. what it is to-day. Fortunately he lived long enough to mould the policies and direct the work of revision of the forthcoming Pharmacopœia, so that the success of it is assured. His place cannot be filled, but his influence on pharmacopœial work, like that on the National Formulary, has been so great that for all time men will know what to do and how the work should be done. He made the compass and the chart, and while difficulties will present themselves and storms will arise, yet there surely must be those who will be familiar with his life and actions so that all will be well in the future, and the U.S.P. will continue to hold its own for all time to come.

Dr. Rice never posed as the reformer; he knew too well the experiences of men from the time of Confucius to Emerson; that what was needed was the work that the present generation required to be done. He, knew, too that this required the co-operation of every one who could contribute to it. He knew who could work and he had them work. He organized and led; and every one else received the honors and emoluments for the work. He was satisfied that the work was done. When the convention of 1890 voted him an honorarium of $1,000, he turned it back into the Revision Committee Fund to pay others for their labors. As chairman of the Revision Committee of 1900 he was voted a salary, but he never asked for it and had not, we believe, been paid for his services. He was the ready worker at all times, doing his own work and that of others too. If the needed work required him, it mattered not the condition of his health or how much other work he had to do, he was ready to do it. When on account of impaired health he asked to be relieved of the chairmanship of the Committee of Revision of the A.Ph.A. in 1878, and after the chairman who succeeded him had resigned, and after several ineffectual attempts to induce other mem-

bers of the Committee to accept the position had failed, he (see Proc., 1879, p. 668), "rather than let the whole plan fail for want of an organization, consented, much against his wish, to re-accept the office on the authority of the Executive Committee and of the President." The entire report is well worthy of perusal, as it shows this man of modesty and self-assurance in a strength and beauty that is most commendable.

Dr. Rice wrote a great many papers, and he never wrote unless he had something of value to say. What many investigators would have put into an elaborate paper he put simply into a statement of fact, as is shown in his answer to the query on "The asserted variable solubility of sulphate of morphia" (see Proc., 1875, 821), of which there is not even a record in the general index. In this connection it may be stated that he was Associate Editor of *New Remedies*, which was subsequently merged into *The American Druggist*. He served as chairman of the Committee on Adulterations and Sophistications of the A.Ph.A. in 1873 and 1874, and demonstrated how useful this committee might be in collating personal observations, private communications and published reports in the various journals bearing on this subject. These reports will always be deserving the careful perusal of committees having this matter in charge, as the disposition of the work, the general deductions and observations, hold as true to-day as then. Dr. Rice served the A.Ph.A. on many occasions. When through failing health Professor Diehl was compelled to resign as Reporter on the *Progress of Pharmacy*, Dr. Rice though not present was elected to help the association out of its dilemma. He arranged for the work, divided the salary among those whom he engaged to assist him in it, arranged the report for the press, read the proof, and even made the index himself. Surely no man in pharmacy acted like this man, giving his time, his money and himself on each and every occasion. He was First Vice-President of the A.Ph.A. at the meeting in Washington in 1883 and doubtless would have been made President of the semi-centennial meeting in 1902.

Dr. Rice was an active member of the College of Pharmacy of the city of New York and was chairman of the Committee on Examinations. He also served the College in other ways; as chairman of the Library Committee and as a member of the Board of Trustees, and in the language of Samuel W. Fairchild, former President of the

College, "was unfailingly and devotedly interested in the affairs of the College and zealous in promoting every measure that seemed to promise improvement in the College work."

All that has been referred to in this brief sketch is but a part of the career of this great man, and was the work accomplished during his period of recreation. His best work was given as chemist and superintendent to the Department of Correction and Charities of New York City. He conducted all this work without permitting the political rings in New York City to influence it in the least; he organized the work and made the department the only one that has not suffered through the influence of political intrigue at one time or other. He so conducted his department that, though the work might be scrutinized with all the malice of a foe, nothing should reward the search but the finding of a faithful adherence to duty.

And yet when all this is said we have but glanced at the personality of this man. He was an unusual scholar and master of a dozen or more of languages. He was a most thorough linguist and recognized as an authority on questions of philology and etymology and was one of the foremost Sanskrit scholars in this country. He was a proficient mathematician, and had a thorough grasp of recent researches in both theoretical and physical chemistry. He was a chemical as well as a biological analyst and was on the staff in the Pediatrics Laboratory in New York City. He had a working knowledge of botany and zoology that simply amazed specialists in these branches. At one time he was doing microscopical work in these sciences, and at another, systematic work. No one comprehended this man in his entirety. To each he revealed a part of himself, and because his attainments in a particular field stood out in such bold relief, men did not comprehend that he was equally accomplished in others, and so men have compared their notes and they each find that he stood for more than they thought; and now that the work of collating the facts of his life, his achievements and his character has begun, they like the hues of the opal and the light of the diamond, will become more and more apparent as we come together and speak of him and write that record.

Dr. Rice was an Honorary Fellow of the New York Academy of Medicine and Honorary Member of the following organizations:

British Pharmaceutical Conference, Philadelphia College of Pharmacy, Maryland College of Pharmacy, German Apothecaries' Society of the City of New York, the Alumni Association of the Philadelphia College of Pharmacy, and the following State pharmaceutical Associations: Louisiana, New Jersey, Ohio and Pennsylvania. He was a corresponding member of the following societies: Société de Pharmacie d'Anvers, Colegio de Pharmaceuticos di Barcelona, Sociedad de Historia Natural de Mexico, Pharmaceutical Society of Athens (Greece) and of the Société de Pharmacie de Paris.

He was a Regular Member of the German Oriental Society of Leipzig und Halle, the American Oriental Society, the New York Academy of Science, the New York Botanic Garden, the American Chemical Society, the American Pharmaceutical Association, the College of Pharmacy of the City of New York, the Committee of Revision of the United States Pharmacopœia, etc.

He received the following honorary degrees: Doctor of Philosophy from the University of the City of New York, and Master in Pharmacy from the Philadelphia College of Pharmacy.

There is but one father of American pharmacy as there is but one "father of his country." These honors cannot be shared. But as the name of Abraham Lincoln in American history, so the name of Charles Rice will endure in the history of American pharmacy. Each, like a meteor, has his own path of glory, and each, like the famous mountain peaks, serve as resting places for our ascending footsteps that we may catch the inspiration to do our part and do it well. Dr. Rice, by reason of his attainments of intellect and character, "indisputably enjoyed an elevated rank in human nature." One ventures to believe that an adequate memorial of him will some day be undertaken. Meanwhile his memory is safe; his work will be conserved and his example we should endeavor to emulate.

PHARMACEUTICAL MEETING.

The last of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1900-1901 was held Tuesday, May 21, 1901. Dr. Adolph W. Miller, Corresponding Secretary of the College and Lecturer on Materia Medica at the University of Pennsylvania, presided. There was a fair attendance, and in other respects the meeting was a fitting close to the series of meetings.

The first speaker was Mr. F. B. Kilmer, New Brunswick, N. J., who read a most interesting and exhaustive paper, entitled "A Story of Papaw." (See p. 272.) Mr. Gordon stated that some years ago, when stationed at Colon, on the Isthmus of Panama, on board the Atlanta, the crew were supplied with salt pork, salt fish and beef, the physician in charge ordered them to get a supply of papaw and wrap the meats in the leaves over night, which rendered them digestible, and as a result the crew were very free from sickness.

In reply to questions by Professor Lowe, Mr. Kilmer said that the natives rub the meat with the papaw and then also boil it with the meat, and that the ferment acts until the boiling point is reached when it is destroyed. Mr. Kilmer said that while it might seem plausible to cut off the fruits and then incise them, this was not found to be practicable as the latex flows but a very short time only after the fruit is removed from the tree.

In reply to the question of Mr. Boring as to whether the custard apple, sometimes found in this region, is the same as the papaw to which Mr. Kilmer referred, Mr. Kilmer stated that the papaw did not occur further north than Jacksonville, Fla., as it will not stand the frost, and Dr. Miller stated that the plant to which Mr. Boring referred is the *Asimina triloba*, an entirely different plant.

Referring to certain portions of the paper, Professor Kraemer said in speaking of the variability of seeds which necessitates a selection on the part of the planters of papaw, that this is due to the fact that all the seeds, even though produced in the same pod or in the same fruit, are not necessarily alike, because each does not receive the same amount of nutriment and hence do not have the same degree of vitality. In this connection he referred to recent investigations which showed that the different commercial varieties of strophanthus were not necessarily derived from different species, but might be obtained from the same species, the difference being due to the position in the pod, those more remote from the direct supplies of food being less, or improperly, developed. He also mentioned the fact that pistillate plants of *Arisæma triphyllum* deprived of the proper amount of nourishment produced the following year staminate plants.

Professor Kraemer also referred to the subject of natural indicators (see this JOURNAL, p. 174) and thought that the color principle

to which Mr. Kilmer referred belonged, in all probability, to this class of substances, which were apparently of rather wide occurrence in nature. He also referred to a recent paper in *Science* (see p. 765), in which the author points out the living character of the ferments.

Frederick T. Gordon read a paper on "Notes on the Use of Methyl Alcohol in Pharmacy" (see p. 285). In the discussion Mr. Wiegand pointed out that the odor in wood alcohol can be removed by passing the electric current through it. Dr. Miller said that it was sometimes used in making bay rum, and that he could always detect the odor, which was very offensive to him. E. Fullerton Cook, Assistant Director of the Pharmaceutical Laboratory, presented some abstracts of recently published articles referring to "The Use of Methyl Alcohol in Pharmaceutical Preparations" (see p. 289). Frederick T. Gordon presented some "Notes on the Spoliation of Syrups," which will be printed in a subsequent issue of this JOURNAL. F. W. Haussmann sent some notes bearing on this question, which will also be published later. Dr. Miller stated that broken rock-candy cost, by the barrel, about 1 cent more per pound than granulated sugar, and that the cost of rock-candy would therefore not interfere to any considerable extent with its use in the preparation of medicinal syrups. Mr. Boring favored Mr. Gordon's suggestion to make syrups in quantity to suit the demand for them. Mr. Boring further said that he used rock-candy in making syrup of hydriodic acid, and that in the preparation of syrup of wild cherry he used the finely powdered bark, which he placed loosely in the percolator. He moistens the bark, pours it into the percolator, allows it to macerate, then removes, moistens again and pours back into the percolator, the extraction then being rapid and satisfactory.

A device for cutting soap, by V. Clyde Michels, was exhibited, which consisted of a ruled board with a wire attached, so that the soap can be cut off in definite sizes. Mr. Boring stated that he heated the soap on a register and cut it with an ordinary spatula. Dr. Lowe suggested that several pieces of wire should accompany the apparatus, as the wire was likely to break, and that he found it necessary to buy a large quantity in order to have it on hand.

On motion of Mr. Boring, which was seconded by Dr. Weidemann, a vote of thanks was tendered the speakers for their communications.

H. K.

PERSONAL NOTES.

THE MONUMENT TO PASTEUR, which is to be erected in his native town, represents, besides a statue of Pasteur, a figure personifying science, who is holding a wreath of laurel toward Pasteur and a woman holding two small children, who are supposed to have been saved from death by Pasteur's discoveries.

A MEMORIAL MARBLE BUST OF ROBERT BROWN, the eminent botanist, has been unveiled in the picture gallery of Marischal College, the University of Aberdeen.

WALTER MYERS' CHAIR OF TROPICAL MEDICINE has been endowed in the Liverpool School of Tropical Medicine, in memory of the late Dr. Myers, whose life was sacrificed in the study of yellow fever.

EMIL BEHRING, Professor of Hygiene and the History of Medicine at Marburg, has had conferred on him on the occasion of the bi-centenary of the Prussian monarchy, the patent of hereditary nobility.

MAX VON PETTENKOFER, Professor in the University of Munich and the eminent authority on hygiene and bacteriology, committed suicide on February 10th, fearing that he would become insane, which fear seems to have been well grounded as the autopsy subsequently showed.

THEODORE HUSEMANN, Professor of Pharmacology and Toxicology of the University of Göttingen, died unexpectedly on February 13, 1901.

HENRY C. BLAIR, a prominent apothecary of Philadelphia, Pa., died on January 7, 1901, after a brief illness.

WILLIAM R. WARNER, senior member of the firm of Wm. R. Warner & Co., manufacturing pharmacists, died April 3, 1901, of apoplexy.

HANS M. WILDER, well known for his ability in preparing indices, in translating and abstracting scientific literature, and in arranging scientific collections, died on January 25, 1901.

A PORTRAIT OF W. W. KEEN, the eminent surgeon and professor in the Jefferson Medical College, Philadelphia, has been presented to that institution by his colleagues and students.

G. A. HANSEN, the discoverer of the lepra bacillus, will have his sixtieth birthday on July 29th celebrated by the erection of a marble bust, in the Lungegaard Hospital, Bergen, where he discovered the bacillus.

THE RÖNTGEN SOCIETY OF LONDON offers, as a gift from its President, a gold medal to be awarded to the maker of the best X-ray tubes.

CHARLES F. CHANDLER, President of the College of Pharmacy of the city of New York, has been appointed by the President a member of the U. S. Naval Observatory.

THE LIST OF THE HONORARY MEMBERS in the Philadelphia College of Pharmacy has been increased by the recent election to membership of Prof. Dr. Arthur Meyer, Marburg, Germany; Dr. B. H. Paul, London; Dr. Charles Rice, New York City (since deceased); Helen A. Michael, Boston; Dr. Charles T. Mohr, Asheville, N. C.

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THE INTERNATIONAL PHARMACEUTICAL CONGRESSES.

By FR. HOFFMANN.*

At the annual meeting of a French pharmaceutical society held at Strassburg in August, 1864, the disadvantages of the constantly increasing manufacture of, and trade in, secret remedies (nostrums) was discussed and the desideratum expressed for counteracting and suppressing this growing and, as was claimed, dangerous evil in medication and pharmacy. A resolution was proposed and adopted for calling an international conference of delegates of the representative pharmaceutical associations for consideration and action in this matter.

It remains a matter of conjecture whether an invitation was extended by French pharmaceutical associations to other societies for arranging such a conference, or whether the resolution passed at the Strassburg meeting became known only by reports published in French, and subsequently republished in other pharmaceutical periodicals. The fact is that at the annual meeting of the General German Apothecaries' Association, held September 14–16, 1864, at Wiesbaden, about one month after the meeting in Strassburg, attention was called to the resolution passed there in regard to the nostrum trade. This resolution was submitted for consideration to a

* At the request of the Editor of this JOURNAL I have, not without reluctance, consented to compile from a few American, British and German periodicals at my disposal this brief and incomplete retrospect upon the so-called international pharmaceutical congresses.

committee consisting of delegates of the North and the South German and the Austrian Apothecaries' Associations, and of the Pharmaceutical Society of St. Petersburg. This committee reported in favor of arranging an international conference for considering the prevailing nostrum evil and preparing a plan for proper and rigid restriction or suppression of the same. As a further topic for consideration it was suggested to come, if possible, to an agreement on a uniform strength of the pharmacopœial formulæ for commonly used galenical preparations of potent drugs, and to units of weights and measures.

This committee rendered at the same meeting the following report, which was unanimously adopted, and may have been the real impetus for the subsequent international pharmaceutical congresses:

"In Anbetracht, dass das Geheimmittel Unwesen mehr und mehr um sich greift, die Regelung der medicinischen Gesetzgebung unmöglich macht, und das Gesundheitswohl des Publikums gefährdet und den Ländern bedeutende Summen Geldes entzieht, erscheint es geboten, Mittel und Wege in Erwägung zu ziehen, wie diesem Unwesen Grenzen zu setzen und es gänzlich zu beseitigen sei.

"Die Würde des pharmaceutischen Standes und das Interesse desselben erfordern es, dass alle pharmaceutischen Vereine diese Bestrebungen kräftig unterstützen und an den bezüglichen Berathungen Theil nehmen. Um dieses zu ermöglichen haben die vereinten deutschen Apothekervereine in ihrer gemeinsamen Versammlung in Wiesbaden im September 1864 beschlossen, die sämmtlichen Apotheker Europa's zur Abhaltung eines internationalen Congresses einzuladen. Als Versammlungsort wählten die beiden deutschen Vereine, in vorläufigem Einverständnisse mit den in den Sitzunzen anwesenden Vertretern der Pharmaceutischen Gesellschaft in Sanct Petersburg und des Oesterreichischen Apotheker Vereins, die Stadt Dresden. Der allgemeine deutsche Apotheker Verein ist geneigt, seine Versammlung im nächsten Jahre dort ebenfalls abzuhalten.

"Nach den uns gemachten Mittheilungen ist die Beschickung des Congresses von Seiten der französischen Apotheker mit Sicherheit zu erwarten.

"Die Bestrebungen gebildeter englischer Apotheker, deren in der letzten Jahresversammlung des Oesterreichischen Apotheker Vereins Erwähnung gemacht wurde, lassen auch einer Betheiligung der Apotheker Englands entgegensehen."

Wiesbaden, d. 14 September 1864.

Dr. Rieckher, Oberdirector des Apotheker Vereins für Süddeutschland; *Dr. Geiseler*, für den Norddeutschen Apotheker Verein; *Dr. G. A. Björcklund*, für die Pharmaceutische Gesellschaft in Russland; *Klinger*, in Vertretung des Oesterreichischen ApothekerVereins.

In April, 1865, an invitation for and programme of, an international conference was issued, signed by the presiding officers (*Dr.*

Bley and *Dr. Geiseler*) of the North German and (*Dr. Rieckher*) of the South German Apothecaries' Associations. It contained the statement that at the last annual meeting of the General German Apothecaries' Association, held at Wiesbaden in September, 1864, a resolution had been adopted for arranging an international pharmaceutical congress, that this proposition meanwhile had met with the endorsement of other pharmaceutical societies at their meetings, and that the city of Brunswick had been chosen as place of meeting.

It was further stated, that the number of attendants should not be restricted, but that only delegates of recognized pharmaceutical associations would be entitled to voting, and that the deliberations will be conducted in the German language, while the use of French and English was also to be admitted.

The following queries were proposed for the consideration of the meeting:

(1) How and by what means can the professional position of the pharmacist be maintained?

(2) How can the insufficient supply of assistants be remedied to the advantage of both the employers and the employees?

(3) Are the benevolent funds instituted in support of sick and invalid assistants and of their widows, a success or a failure?

(4) What are the main disadvantages prevailing in maintaining the standing and the prosperity of the pharmacist?

(5) Would the principle of free competition extended to pharmacy improve the condition of the pharmacist and offer any advantage to the public?

(6) How can a uniformity of the formulæ of the pharmacopœial galenicals be attained?

(7) Is the universal introduction and adoption of the metric system in weights and measures desirable and what is the best way to bring it about?

(8) Should pharmacopœias invariably be written and published in the Latin language?

(9) How can quackery and the nostrum evil effectually be checked and suppressed?

(10) How is the sale of poisons to be regulated so as to prevent abuse dangerous to life and health, without at the same time making the useful application of poisons too difficult?

FIRST INTERNATIONAL PHARMACEUTICAL CONGRESS IN BRUNSWICK, 1865.

The *Congress* took place immediately after the annual meeting of the North German Apothecaries' Association in *Brunswick*, September 16 and 17, 1865. Only a few sessions were held and attended by twenty-nine delegates, representing twelve pharmaceutical societies of Germany, Austria, Russia, France and Sweden.

Mr. *Dittrich,* of Prague, was elected President and Mr. *Robinet,* of Paris, Vice-President.

The following conclusions were the result of the deliberations on the before-stated respective questions submitted to the Congress:

(1) By obligatory higher preliminary education and an adequate professional education consisting of three to three and a half years' apprenticeship (two to two and a half years for young men of superior preliminary education), of three years' service as assistant, and three terms of university or college study. The requirements at the State examination for obtaining the license as apothecary should be raised, particularly in inorganic and organic chemical analysis.

(2) By the same measures as proposed in the reply to the first question.

(3) No definite conclusion was obtained.

(4) Repression of the nostrum trade and the dispensing of medicines by medical practitioners.

(5) This question was answered in the negative. Experience demonstrates the fact that free competition has proved of rather detrimental consequences, nor is it conducive to cheapening the prices of medicines.

(6) At the periodical revision of the various pharmacopœias a uniformity of the formulæ should be gradually attempted.

(7) The desirability of the adoption of metric units was generally conceded, and the opinion prevailed that it should be made obligatory by governmental ordinances. The introduction would not cause any considerable difficulty or inconvenience.

(8) Generally consented as best and even necessary.

(9) The discussion of this question was a very animated one. The nostrum industry was declared unethical and discreditable. No government ought to permit this trade, detrimental to public and private health, nor protect by patent or trade-mark rights alleged or empirical medical discoveries when introduced as secret remedies or specialties. The pretended formulæ of the constituents of nostrums are mostly vague or incorrect, and the certificates for their efficiency fraudulent or obtained by bribes. The nostrum trade is based upon false pretenses, deceit and popular credulity, and should be repressed by all means.

Cosmetics should be placed under the control of the health authorities.

Even the French delegates endorsed these sentiments, stating that the French pharmaceutical associations recently had expelled from membership all makers of specialties, and that the great majority of French pharmacists discountenanced nostrums.

At the conclusion of the Congress a standing committee for selecting place and time and initiating the proper arrangements for holding a second Congress after the lapse of three years, was appointed, consisting of the presidents of the five principal pharmaceutical societies of the Continent,

The two pharmaceutical societies of Great Britain and the Ameri-

can Pharmaceutical Association, although invited in time, were not represented at this first International Congress. The Council of the Pharmaceutical Society of Great Britain rendered at its meeting, August 2, 1865, the following response to the invitation received:

"Whilst this Society estimates highly the proposed objects of holding an international conference of pharmacists, and would gladly give any facilities in its power to their prosecution, it is scarcely within its functions as a corporate body to appoint representatives thereto. We would, however, draw the attention of the Committee on Arrangements to a voluntary association existing in this country under the title 'British Pharmaceutical Conference,' one of whose objects is a correspondence with societies with similar aims in other countries, to whom such a communication may be addressed. This being done, the Pharmaceutical Conference would probably arrange, if practicable, to co-operate in some way at a future meeting."*

SECOND CONGRESS IN PARIS, 1867.

The committee elected at the Congress in Brunswick, selected Paris as the place for holding the second meeting and confided all arrangements to the Society of Pharmacy of Paris. The committee of this society addressed, early in 1867, an invitation to and programme for, the Congress to be held on August 21–25, 1867, at the time of the second World's Fair in Paris.

The programme argues "that pharmacy in Europe at this time is in an unhealthy and critical condition, not less injurious to the true interests of the public than to those of the profession itself. This critical situation has been explained by the Congress of Brunswick, and that body has given the results of its deliberations in the form of resolutions.

"In consonance with the present efforts of various countries to attain to an international uniform type in weights, measures, moneys, etc., the Congress will naturally be led to recognize the necessity of a code or legal formulary as a guide to the pharmacists of all countries. This code will insure uniformity of composition and strength in the commonly used medicines, particularly the more potent ones."

The Committee of Organization therefore proposes the following questions to be considered at the meeting of the Congress of 1867.

(1) What character should be attributed to the pharmacist? What are the functions he should perform and what conditions ought he to accomplish in order to acquit himself of his professional obligations?

*_Pharmaceutical Journal and Transactions_, 1865–1866, p. 93.

(2) What are the most expedient ways and means of elaborating a code or formulary of official medicines, for which it is important to establish a uniform composition?

(3) What are the best and most practical means of determining the amount of active principles, especially of alkaloids in the drugs containing them, and in the galenical preparation of these drugs?

Each association will be entitled to three delegates, national associations to three delegates for every 100 of its members, but each delegation will have only one vote.

The Congress was attended by about fifty delegates from France, three from Holland, two from the United States (Wm. *Procter, Jr.*, of Philadelphia, and *John Faber*, then residing at Nuremberg), three from Germany, four from Austria-Hungary, three from Russia, two from Spain, two from Switzerland, one from Italy, one from Sweden and one from Egypt. *Dr. Rieckher*, of Germany, was elected President, with five honorary vice-presidents.

The deliberations seem to have been not strictly in the line of the proposed questions. The main discussions and resolutions related to the following subjects:

How can the status and prosperity of the practice of pharmacy be best advanced?—By restriction of the relative number of pharmacies and by a proper control and limitation in proportion to the number of inhabitants and the increase of population. The American delegates were the only ones who voted in the negative.

It was recognized to be advisable to institute pharmaceutical advisory boards for assisting the Government in the proper regulation and control of pharmaceutical and sanitary affairs. In this connection, a resolution was added, declaring that the trade in nostrums and trade-marked specialties and their advertisements in the newspapers should be strictly prohibited. The American delegates refrained from voting on this question.

The traditional problem of an international pharmacopœia caused a long but unavailing discussion. It was finally agreed that the Latin language was the best one for a universal code and that the elaboration of such a one should be undertaken. Only the delegates of the United States voted against this resolution for the reason that the broad differences of views in regard to many important galenical preparations in use in America, as well as in England, together with the numerous preparations and drugs used on the continent and not esteemed in America and England as meri-

torious, were obstacles too great to meet the approval of American and British pharmacopœia committees.

At the conclusion of the Congress, the Committee of Organization for a next Congress, appointed at the Brunswick meeting, was re-elected and Vienna proposed as place for assembling.

THIRD CONGRESS IN VIENNA, 1869.

The invitations and programme having been sent out early in 1869, the delegates to the Third International Pharmaceutical Congress convened in Vienna, September 9, 1869. The following countries were represented by delegates: Austria by twelve, Germany by nine, Russia by three, France by three, Italy by one, Switzerland by one, England by two (H. S. *Evans* and Theoph. *Redwood*) and the United States by one (John *Faber*, of Nuremberg). Mr. Wm. *Dankworth*, of Germany, was elected President and Messrs. *Robinet*, of France, and *Trapp*, of Russia, Vice-Presidents.

The questions submitted to the Congress were:

(1) Are independent schools of pharmacy desirable?—The delegates of the various countries briefly described the collegiate education at home. They finally agreed upon the resolution that higher pharmaceutical schools, as an integral part of universities, with pharmacists as professors in the classes relating exclusively to pharmacy, would be preferable in the interest of both the public and the profession.

(2) What advantages will arise from syndical chambers proposed at the preceding Congress?—The committee to whom this query had been submitted reported in favor of establishing such syndical chambers as representative and advisory bodies between the pharmaceutical association and the Government. They might be formed of delegates from the pharmaceutical corporations within certain districts. Their duties would consist in representing the profession in forming new regulations affecting pharmacy, and in acting as executive bodies for the proper working of existing laws.

(3) Is the supremacy of the medical profession in regulating pharmaceutical matters compatible with the present professional and social standing of the pharmacist, and does it conduce to the interests of the State, the public and the pharmacist?—This question applied to pharmacy in continental Europe only. The delegates shared in the opinion that the scope and the extent of medical knowledge

have reached such an amplitude that medical men on the average cannot any more enter upon the study of pharmaceutical branches, that, therefore, the pharmacist should replace the physician in the conduct and regulation of purely pharmaceutical affairs. If the governments have any doubt in their professional ability to do so, they should raise the standard of pharmaceutical education and the requirements at the State examinations.

(4) What should be done to attain to the greatest possible uniformity in the composition and strength of the pharmacopœial preparations?—It was stated that the Pharmaceutical Society of Paris had volunteered to undertake the compilation of a comparative conspectus showing side by side the differences existing in the various pharmacopœias in regard to the composition and relative strength of the identical galenical preparations in the various countries in order to initiate steps to have the pharmacopœias adopt uniform formulæ in course of time. This work has been commenced and will be submitted to the next Congress.

(5) What methods are best for assaying the organic alkaloidal drugs?—This question was dropped as hardly pertaining to the present objects of the Congress. It was, however, acknowledged that the methods for ascertaining the proportion of the active principles of drugs prescribed in the pharmacopœias needed improvements and that this matter belonged to the domain of the committees of pharmacopœial revision.

In conclusion it was resolved that the President may prepare a report on the resolutions of the Congress and communicate this report to the governments of those countries who were represented by delegates.

The proposition was made and endorsed to hold the fourth International Pharmaceutical Congress after the lapse of three years. The presidents of the National Pharmaceutical Associations of Austria, Germany, Russia, and France were delegated as a committee for selecting the place of the meeting and making in time, the proper arrangements for such a meeting. The delegate from Russia tendered an invitation to hold this in St. Petersburg.

THE FIRST MOVE TO INVITE THE CONGRESS TO HOLD A MEETING IN THE UNITED STATES OF AMERICA.

In consequence of the Franco-German war in 1869 and 1870 the

holding of the fourth Congress within the time stipulated at the preceding meeting in 1867 was delayed for two years. Meanwhile an initiatory move was made by Professor *Maisch* and endorsed by President *E. H. Sargent* in his presidential address before the annual meeting of the *American Pharmaceutical Association* held in Baltimore, Md., in September, 1870, for holding the fifth Congress in Philadelphia in the Centennial year, 1876. This proposition met with approval and a committee consisting of Messrs. *Wm. Procter, Jr., Albert E. Ebert* and *Fred. Hoffmann* was appointed to report on the subject with a plan of action, at the meeting of the Association in 1871.

This committee presented the following report to the American Pharmaceutical Association at its meeting in St. Louis, September, 1871:

That in view of the notable period in the history of our country, the Centennial anniversary of its political independence, which will be reached in the year 1876 we are called upon, in common with all citizens of the Republic, to manifest our patriotic impulses in a worthy manner, by showing the advancements made in the arts and sciences, and the progress towards a higher civilization. Further, as at that time unusual inducements and attractions will doubtless cause many to visit this country from foreign lands, it is believed that so favorable an opportunity will not soon occur again to bring together in this country pharmacists of Europe.

It is therefore recommended that the International Pharmaceutical Congress be solicited to postpone the meeting which would occur in its regular order in 1875, and that this Association extend a cordial invitation to that body to meet in this country in the year 1876. But if for any reason the Congress should deem it not advisable to accept such invitation, it is recommended that an invitation be extended to the delegates present at the meeting in 1872, and to the pharmacists of all nations, to meet with this Association in 1876.

Your committee further recommends, that at the present meeting the month of July and the city of Philadelphia be designated as the time and place for the meeting of 1876, it being manifestly appropriate that the meeting of that year should be held in the centre of pharmaceutical and political interest, and in the month dedicated to the celebration of our National Independence. The action recommended seems necessary at this time, in order that our annual meetings intervening may be located in view of such decision, and that appropriate efforts may be made to insure at that meeting a full representation of American pharmacists, thereby making this association a truly national brotherhood of all engaged in our noble profession.

Your committee further recommends the appointment of a committee at this meeting for devising suitable plans and recommending such preliminary arrangements as seem necessary to render the meeting of 1876 worthy of the occasion.

[Signed] ALBERT E. EBERT.
FRED. HOFFMANN.

Professor *Procter* refrained from signing this report on account of the fact that the International Congresses thus far have only devoted themselves "to correcting abuses that exist in Europe in the laws bearing on the profession there. By transferring their delegates to this country, to act here just as they do there, would be unpracticable and unavailing in consideration of the very different views and usages prevailing in the practice of pharmacy in the United States and England."

At the meeting of the American Pharmaceutical Association in St. Louis, September, 1871, it was, however, stated that, although all the discussions of the International Congresses thus far held amounted to very little to American pharmacists, inasmuch as they naturally had been discussing subjects of particular interest and application only to the country in which they met. If they should come here where the conditions under which pharmacy is practised are essentially different from those existing in Europe, the questions to be discussed and the deliberations would undoubtedly be pertinent to and in accordance with these conditions.

The report of the committee and the motion to invite the International Pharmaceutical Congress to meet in the United States in 1876 was unanimously adopted with but two dissenting votes, and the city of Philadelphia was chosen as place of meeting.

In compliance with these resolutions the following invitation was addressed, July 13, 1874, by the *American Pharmaceutical Association* to the fourth International Pharmaceutical Congress at St. Petersburg:

* * * In the year 1876 occurs the one hundredth anniversary of the Independence of the United States of America. This historical event will be celebrated throughout our country, and an international industrial exposition will be held in the city of Philadelphia. * * *

It is more than probable that this Industrial Exposition will be visited by many European pharmacists, and that this occasion will be a fit and convenient opportunity to unite the delegates of the pharmaceutical societies, throughout the civilized world, in council on the questions affecting the present and future status of pharmacy among the nations, or having a practical or scientific importance for our profession.

The officers of the American Pharmaceutical Association, in carrying out the resolution of this association adopted at its meeting in St. Louis in 1871, cordially invite the fourth International Pharmaceutical Congress to appoint the year 1876 and the city of Philadelphia as the time and place of meeting of the fifth Congress.

* * * Should the fourth Congress deem it inexpedient to call the fifth Congress to meet in the United States in 1876, we now invite all the societies which may be represented at the St. Petersburg Congress, and all pharmacists, to meet the American Pharmaceutical Association at its twenty-fourth annual meeting, which will be held in Philadelphia during the International Industrial Exhibition in 1876.

[Signed] JOHN F. HANCOCK,
President.

JOHN M. MAISCH,
Permanent Secretary of the Amer. Pharmac. Association.

This letter of invitation was laid before the Congress at St. Petersburg, as stated further on. As no response had been received from the presiding officers of the Congress until nearly one year after the letter had been sent, the Permanent Secretary of the American Pharmaceutical Association addressed, on June 3, 1875, the following inquiry to the President of that Congress:

The American Pharmaceutical Association will hold its twenty-third annual meeting in Boston early in September, 1875, and will then determine upon the proper measures for its twenty-fourth meeting, which will convene in Philadelphia during the International Exhibition in 1876. You are aware that the fourth International Pharmaceutical Congress was invited to call the meeting of the fifth Congress to assemble in Philadelphia in 1876. The selection of the proper place and time having been referred to the International Congress Committee, I take the liberty of inquiring of you whether that committee has decided upon the invitation above referred to.

I also beg to ask for information in relation to the proposed draft of an international pharmacopœia; if possible, the American Pharmaceutical Association desires to participate in its elaboration.

[Signed] JOHN M. MAISCH,
Permanent Secretary, A.Ph.A.

PHILADELPHIA, June 3, 1875.

It seems that no reply has been received to this letter neither. This ended the first effort of inducing the Congress to hold a meeting in the United States during the Centennial year 1876.

(*To be continued.*)

THE LOWERING OF THE TEMPERATURE OF WATER of maximum density by solutions of various salts is shown by de Coppet (*Compt. rend.*, May 20, 1901) to be proportional to the quantity of the substance dissolved and that with the exception of lithium salts the molecular lowering is almost constant.

RECENT DEVELOPMENTS IN THE STUDY OF THE RELATIONSHIP BETWEEN CHEMICAL CONSTITUTION AND PHYSIOLOGICAL ACTION OF ORGANIC COMPOUNDS.

BY PROF. VIRGIL COBLENTZ.

(*Concluded from p. 272.*)

RELATIONSHIP BETWEEN TASTE AND CHEMICAL CONSTITUTION.

Sweet and bitter taste has long played a very important part in modern medicine and pharmacy. Formerly resort was always had to the use of corrigents. However, of late years, synthetic chemistry has endeavored to solve this question from a purely scientific standpoint, through the introduction of certain groups which would not interfere in any manner with the therapeutic effects of the original substance.

In alcohols of the aliphatic series the sweetness increases to a certain extent with the number of entering hydroxyl groups, as for example, the glycols, glycerol, mannitol. The polyhydric alcohols are less sweet than their corresponding aldehydes and ketones, as for example, mannitol and its aldoses and ketoses.

CH_2OH	CH_2OH	CH_2OH
|	|	|
$(CHOH)_4$	$(CHOH)_4$	$(CHOH)_3$
|	|	|
CH_2OH	$C{=}O$, $-H$	CO
		|
		CH_2OH
Mannitol.	An Aldose.	A Ketose.

According to W. Sternberg, the hydroxyl (OH) and amido (NH_2) groups are taste generators, the entrance of one hydroxyl carries odor and two or more taste. The presence of a carboxyl group produces in all cases a sour taste. Stereo geometrical configurations play no part. This investigator also claims that a certain harmonic relation between the substituting hydroxyl and the substituted alkyl groups is necessary for the development of sweet taste. Every alkyl group must stand opposite a hydroxyl, as is the case in glycerol and mannitol. The alkyl groups may be permitted to exceed the hydroxyls by one member only, so that the

molecule contains one oxygen less than carbon without the sweet taste suffering, for this reason the disaccharides (sucrose) are sweet and the tri and poly-saccharides are tasteless.

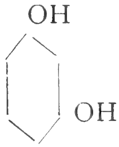
On replacing the alkyl radical in glucoses by a phenyl, an intense bitter substance results.

CH_3	C_6H_5
|	|
CHOH	CHOH
|	|
CHOH	CHOH
|	|
CH_2OH	CH_2OH
Butenyl Glycerol	Phenyl Glycerol
Sweet.	Bitter.

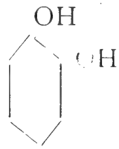
The natural glucosides are bitter because they are mostly phenol derivatives.

Symmetry of the hydroxylated compound is also necessary, thus those di and tri-hydric phenols whose substituting groups occupy the symmetrical meta position are sweet, for example:

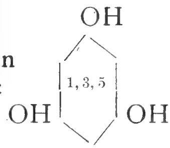
Resorcin
m-dioxy-benzole
sweet



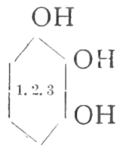
Pyrocatechin
o.dioxy-benzole
bitter



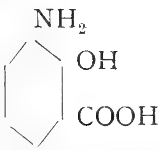
Phloroglucin
symmetric
sweet



Pyrogallol
bitter



The amido group (NH_2) lends a sweet taste to hydrocarbons under the conditions that a negative carboxyl group (COOH) is present and the other groupings are closely linked, thus the ortho-amido-salicylic acid is feebly sweet, while the para and meta compounds are tasteless.

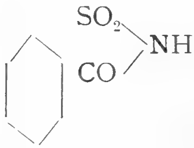


Ortho-amido-salicylic acid

Amido-benzoic acid loses its sweet taste through the introduction of an extra acid group and only in

Ortho-sulfamid-benzoic acid

through the close linkage brought about by the andride formation is an intense sweet taste developed



Ortho-benzoic sulfinid.

To correct taste, efforts are generally directed toward either closing the reactive groups through the addition of radicals or the conversion of the substance into an insoluble compound which, however, must be of such a nature as to readily split up in the alkaline secretions of the intestinal canal. Efforts to render quinin salts tasteless have been successful in such combinations as quinin chloro carbonic ester $CO \cdot Cl \cdot C_{20}H_{23}N_2O_2$, also Euchinin—an ethyl carbonic ester of quinin $C_2H_5O — CO — OC_{20}H_{23}N_2O_2$

Freedom from tinnitus as well as from taste is claimed for these salts.

The tasteless character of quinin tannate is known to us all. The disagreeable taste and undesirable action in the stomach produced by tannin are repressed by forming an insoluble compound with albumen, casein or gelatin, as for example in such compounds as Tannalbin (a compound of tannin and albumin), Tannigen (acetic ester of tannin), Tannon (a condensation product of tannin and urotropin), Tannoform (a condensation product of tannin and formaldehyde). These are all valuable intestinal astringents. In this connection the salol class of intestinal antiseptics introduced by Nencki may be mentioned. Here not only the taste but also the caustic action of many substances is avoided through esterification.

Salol $C_6H_4\begin{cases} OH \\ COOC_6H_5 \end{cases}$ *Phenyl salicylic ester.*

Betol	$C_6H_4\left\langle\begin{matrix}OH\\ COO - C_{10}H_7\end{matrix}\right.$	*Salicylic napthyl ester.*
Salacetol	$C_6H_4\left\langle\begin{matrix}OH\\ COO - CH_2COCH_3\end{matrix}\right.$	*Salicyl acetol.*
Salophen	$C_6H_4\left\langle\begin{matrix}OH\\ COO \cdot C_6H_4\left\langle\begin{matrix}NH\\ COCH_3\end{matrix}\right.\end{matrix}\right.$	*Aceto-para-amido-salol.*
Cresalols	$C_6H_4\left\langle\begin{matrix}OH\\ COO \cdot C_6H_4CH_3\end{matrix}\right.$	*Salicylic-cresylic esters.*

As esters of Guaiacol

$$C_6H_4\left\langle\begin{matrix}OH\ (1)\\ OCH_3\ (2)\end{matrix}\right.$$

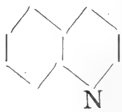
we have the valuable comparatively tasteless and less disturbing compounds

Duotal	$CO\left\langle\begin{matrix}O - C_6H_4OCH_3\\ O - C_6H_4OCH_3\end{matrix}\right.$	*Guaiacol carbonate.*
	$C_6H_3\left\langle\begin{matrix}OH\\ -OCH_3\\ COOH\end{matrix}\right. + 2H_2O$	*Guaiacol carbonic acid*
Benzosol	$C_6H_4\left\langle\begin{matrix}OCH_3\\ O - C_6H_5CO\end{matrix}\right.$	*Guaiacol benzoate.*
Styracol	$C_6H_4\left\langle\begin{matrix}OCH_3\\ O - C_6H_4 - CH=CH - CO\end{matrix}\right.$	*Guaiacol cinnamate.*
Geosote	$C_6H_4\left\langle\begin{matrix}OCH_3\\ O - COCH_2 - CH=(CH_3)_2\end{matrix}\right.$	*Guaiacol valerate.*
Guaiamar	$C_6H_4\left\langle\begin{matrix}OCH_3\\ O - CH_2 - CHOH - CH_2OH\end{matrix}\right.$	*Guaiacol glyceryl ether.*

ANTIPYRETICS.

Formerly the efforts of the synthetic chemist were directed toward producing bodies analogous in character and action to the well known quinin. Ten years ago the views as to the constitution of quinin were

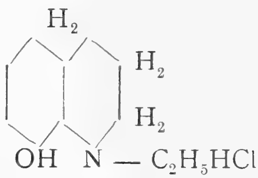
erroneous, hence such synthesized substances differed essentially from this alkaloid. Of all the synthetic antipyretics none possess the most important function of quinin, that is, its specific action in malaria. Quinolin



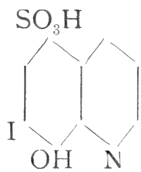
being the mother substance of quinine, was necessarily the basis of these attempts. Filehne found that only the alkylated nitrogen of a tetrahydro quinolin was worthy of trial; following this came Fischer's Kairin, Kairolin and Skraup's Thalline

Kairin

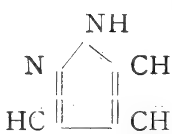
(ethyl-ortho-oxy-quinolin tetra hydride).



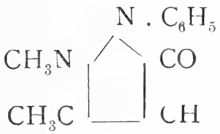
Owing to the unpleasant and sometimes dangerous toxic side actions this class of derivatives has been dropped. This nucleus furnishes us, however, a valuable antiseptic in Loretin (meta-iodo-ortho-oxy-quinolin-ana-sulfonic acid).



With the intention to produce a quinine-like body Knorr discovered antipyrin. This investigator's views as to the constitution of this synthesized body were at first erroneous. Knorr thought that this newly discovered body was a di-methyl-oxy-chinizin in which two quinolin molecules were linked to the pyridin nucleus, as was supposed to be the case with quinin. Later it was found that the five-membered ring Pyrazol

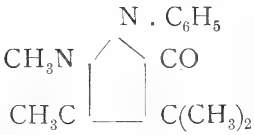


was the nucleus, antipyrin being a phenyl 1 — dimethyl 2, 3 — pyrazolon 5.



Tolypyrin resulting through the introduction of a methyl group possesses a more irritating action, 4 grammes bring equivalent to 5 to 6 of antipyrin.

The only active competitor of antipyrin belonging to this series was found in Pyramidon, a di methyl-amido-antipyrin which is three times as active as antipyrin



ANILIN DERIVATIVES.

The accidental discovery of the antipyretic and anti-neuralgic properties of acetanilid led to its study and subsequent unlimited application in the preparation of innumerable medicinal derivatives. The introduction of acid radicals in place of a hydrogen of the amido group of a base results in the diminution of its toxic action on the ground that the substance has become more resistive to the decomposing action of the body fluids; hence acetanilid $C_6H_5NHCH_3CO$ represents the toxic characters of anilin but in a milder degree, its action being that of anilin in a weak and protracted condition.

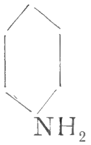
Benzanilid $C_6H_5NHC_6H_5CO$ splits up with difficulty and slowly in the system, hence its action is milder than that of acetanilid. Salicylic anilid fails to break up, hence is without action.

PARA-AMIDO-PHENOL DERIVATIVES.

With the experience of acetanilid and its derivatives synthetic chemists made systematic efforts to build up a substance which should represent the antipyretic and antineuralgic properties of acetanilid without its unpleasant side effects and action on the hemoglobin of the red blood-corpuscles.

The investigations of Schmiedeberg demonstrated that anilin was altered and rendered less toxic in the organism through oxidation in the para position yielding para-amido-phenol.

Anilin (amido-benzol)



Para-amido-phenol

With this in view, also that para amido phenol was less toxic than anilin, an acetyl radical was introduced with the hope of obtaining an ideal antipyretic. The resulting acetyl para amido phenol still possessed toxic antipyretic symptoms, hence it was found necessary to close or protect the free hydroxyl group through the introduction of an alkyl radical. If a methyl group is employed, methacetin results; an ethyl, phenacetin; other alkyls, as propionyl, butyryl, etc., have been employed in place of the ethyl, but the resulting compounds, because of their great insolubility, react too slowly in the system.

$$C_6H_4\begin{cases} OCH_3 \\ NH_2 \end{cases}$$
Anisidin

$$C_6H_4\begin{cases} OCH_3 \\ NHCH_3CO \end{cases}$$
Methacetin

$$C_6H_4\begin{cases} OC_2H_5 \\ NH_2 \end{cases}$$
Phenetidin

$$C_6H_4\begin{cases} OC_2H_5 \\ NHCH_3CO \end{cases}$$
Phenacetin

The maximum of antipyretic and antineuralgic action is found in the methyl derivative (methacetin), while the least toxicity is possessed by the ethyl derivative (phenacetin). The readiness with which the acid secretions of the stomach split off the acid rest preparatory to the decomposition of the resulting phenetidin nucleus depends largely upon the nature of the acid employed. Among these derivatives in which the acetic acid rest of phenacetin is replaced by other acid rests are lactic (Lactophenin), valeric (Sedatin), salicylic (Saliphen), phenyl glycolic (Amygdophenin), vanillic (Vanillin-p-phenetidin), etc.

Each of these possesses slightly different characters as regards solubility, rapidity of action, varied elimination of toxic effects, etc.

Owing to the insolubility of phenacetin, one of the earliest endeavors was to obtain a compound sufficiently soluble to enable its employment in solution. This was accomplished by the addition of a basic group, glycocoll (amido acetic acid), which, through its amido group, is capable of uniting with other acids and forming very soluble salts.

$$\text{Phenocoll } C_6H_4\begin{cases} OC_2H_5 \\ NHCH_2NH_2CO\ .\ HCl. \end{cases}$$

Amido-acet-para-phenetidin hydrochlorid. The soluble salts are the hydrochlorid, acetate and salicylate (Salocoll).

All antipyretics act in a greater or lesser degree on the blood in which the oxyhæmoglobin is converted into methæmoglobin and the respiratory capacity lessened and the red blood-corpuscles modified, the blood pigment at times being set free.

According to Schmitt these remedies may be divided into the following classes:

(1) Antipyretics, which in moderate doses oxidize the hæmoglobin, as antipyrin and phenacetin.

(2) Remedies which in moderate doses fix the methæmoglobin within the blood-corpuscles as thallin, antithermin, kairin, exalgin, methacetin, acetyl amido-phenol.

(3) Remedies which fix the methæmoglobin, destroy the red corpuscles and set free the methæmoglobin which appears in the urine, for example, acetanilid, benzanilid, formanilid, pyrodin, etc.

The ideal antipyretic and antineuralgic with a specific antimalarial action has not as yet been found, and will not until either accident or a more accurate knowledge of the structure of quinin furnishes the means.

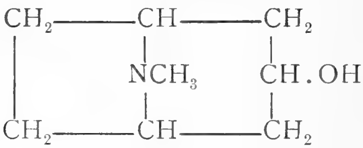
LOCAL ANÆSTHETICS.

On hydrolizing cocain with mineral acids, methyl alcohol and benzoic acid with the nucleus Ecgonin result, neither possesses local anæsthetic action.

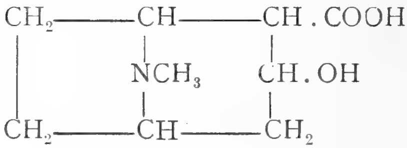
It does not matter which alkyl radical replaces the methyl of the $COOCH_3$ group, the homologue retains the typical properties of cocain.

Of greater importance is the replacement of the benzoyl group in cocain by other acid radicals, the anæsthetic properties are either lessened or disappear entirely.

Filehne thought that the benzoic acid rest was necessary, on the ground that atropin, Homatropin and the benzoic derivatives of other alkaloids, as morphin, hydrocotarnin and quinin, possessed local anæsthetic action.



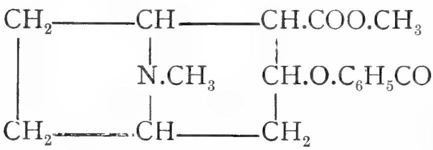
Tropin



Ecgonin

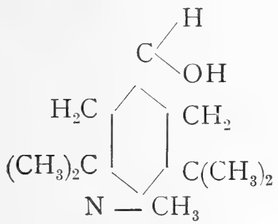
For the development of the action of cocain the position and union of the OH and COOH groups are of great importance, hence the stereo chemical configuration of the ecgonin nucleus is essential in conjunction with the anchoring benzoyl group. The methyl group covers the acid and irritating characters of ecgonin.

Further, the derivatives of tropin, which do not contain a carboxyl, the addition of a methyl group is not essential for action. On the other hand, the presence of an esterized carboxyl increases activity. The mydriatic effect stands likewise in close relationship to the fundamental base (a pyrrolidin), but the localizing action is governed only by aromatic acid radicals, as is the case in atropin and homatropin. Based on the view of Merling, that cocain was made up of two ring nuclei, and that one, a *methylated piperidin*, was the active base, several products were synthesized from the methylated base triaceton alkamin, namely

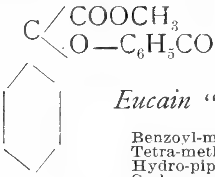


Cocain

Benzoyl-methyl-ecgonin

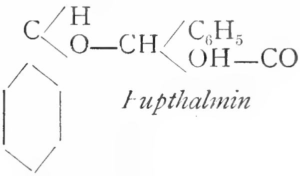


Triaceton alkamin.

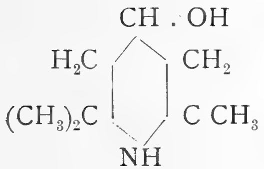


Eucain "A"

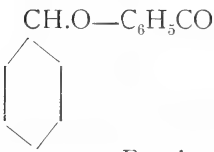
Benzoyl-methyl
Tetra-methyl
Hydro-piperidin
Carboxy-methyl
Ester.



Eupthalmin



Vinyl diaceton alkamin.



Eucain "B"

the local anæsthetics eucain "A" and eucain "B" and the myotic euphthalmin

Eucain A, which is closely related to tropa cocain, is a local anæsthetic, it does not produce a dilation of the pupil, however, its irritating action on mucous surfaces are detrimental to its use. More successful as a substitute for cocaine was Eucain "B," which is free from irritating action and more active and less toxic than the former. Chemically, eucain "B" is the benzoyl derivative of the base vinyl-diaceton-alxamin, and like cocain, it loses its local anæsthetic effect on replacing the benzoyl radical with an acetyl. If a mandelic acid radical (C_6H_5—CH(OH)CO) is introduced in place of the benzoyl of eucain "B," the very active mydriatic eupthalmine results. The hydrochlorid of this base has chemically the same relation to eucaine "B" as homatropin has to tropa-cocain, that is euphthalmin is the hydrochlorid of the mandelic acid derivative of eucain "B."

Einhorn and Heinz have prepared various derivatives of the other half of the ecgonine complex, namely hexa-hydrobenzole. They found that all the esters of the aromatic hydroxy-amido acids possessed local anæsthetic properties, particularly so the methyl ester of para-amido-meta-oxy-benzoic acid ($C_6H_3(OH)(NH_2)COOCH_3$) which is called *orthoform*.

THE STORY OF THE PAPAW.

By F. B. Kilmer.

(*Continued from page 285.*)

THE MILK OF THE PAPAW.

Trees that give milk are plentiful in the tropics. The native name for the papaw is "lechoso" (a producer of milk). When an incision is made in the bark of any part of the tree or in the fruit rind, a limpid, milk-like liquid exudes very freely. It is slightly more dense than water, and in contact with the air quickly coagulates and closes the incision. This coagulation is a rather notable phenomenon.

For the fraction of a minute the liquid flows as though a milk bottle were uncorked, and one imagines that gallons will run without stopping, but suddenly it ceases. On examination it is found that the milk is coagulated for a considerable distance within the glands. I am quite firmly convinced that this action is due to the presence of a clotting enzyme. This assumption is made probable by the fact of the quite universal presence of pectin in plants, and further from the fact that I have proven the presence of calcium salts and pectic compounds in the latex of the papaw. This statement is further strengthened by my observation that the latex of the papaw will coagulate the juice (neutral or alkaline) of certain other plants. The presence of rennin ferment in the latex of the papaw is noted elsewhere in this paper. Its behavior is, in many respects, unlike that of the jelly-forming enzyme here noted, and, while further examination of fresh material is needed before making any fuller statement, I think I am safe in announcing that we may add the papaw latex to the list of plant juices in which the pectase ferment has been noted.

The odor of the fresh milk is pronounced, and not unlike that of the latex of the india-rubber tree, and, on the whole, is a disagreeable one, suggestive of decayed meat. The taste is somewhat bitter, rather markedly astringent and acrid. When dried by artificial heat the ferment power is weakened or lost, if dried in the sun it retains its activity and about 75 per cent. of moisture is separated.

This milky emulsion seems to be secreted for the most part in fairly large vessels (readily observable by a pocket lens), which lie just under the epidermis in every part of the plant. In the ripened

fruit it seems to permeate to all parts of the fleshy portion of the fruit (somewhat changed in character). The supply of milk in a vigorous tree is very abundant. After making several prolonged incisions in a single fruit, I estimated that an entire tree must contain several hundred ounces, but no such amount can be obtained by any practical method.

The dried milk of the papaw is an article of commerce, and its character is dependent upon the method of preparation. The main source is the crude method of the natives. The usual proceeding

Selling papaw fruit in the market.

is to make an incision just through the rind of the green fruit; the milk flows freely for a short time; this is caught in a dish, coagulation follows closely, and the milk oozes slowly through the incision for twenty-four hours or more. If numerous incisions are made in the fruit, it will, at the end of this time, become ½ an inch thick. The milk is most abundant after heavy rainfalls, from the first fruits of the tree, and naturally so from vigorous plants.

The latex, when allowed to dry on the fruit, becomes discolored

and dark. The lighter-colored and best products are produced when the coagulated juice is removed as fast as it exudes, spread out thin and quickly dried.

No advantageous method of gathering the milk has come under my observation. Some of the difficulties of the present usages can be imagined by the recollection that in some cases the fruits are from 20 to 30 feet from the ground. The coagulation allows only a small yield, requiring constant climbing to make fresh incisions. The latex yields 25 per cent. of dried material (still containing 6 to 10 per cent. of moisture). Under favorable conditions I extracted 100 grammes of latex from one fruit. One gatherer claimed an average yield of one pound of dried milk from each tree per year, though under somewhat adverse conditions it required fifty trees to yield one pound of dried milk.

OFFICE OF THE MILK AND ENZYME.

The office of this milk in the economy of the papaw is not easy to explain. Parkin (*Pharmaceutical Journal*, 1578, page 337) states: "The most important function of such a latex is that of holding water in reserve." This seems hardly possible in respect to this plant because all tissues of the plant are filled with a watery fluid, so much so that they flow upon cutting, and it is hardly possible that the tree is dependent upon the milky juice for a supply of moisture. The native observers suggest that the milk has to do solely with the ripening of the fruit, and it is true that as the fruit ripens it is in all parts permeated with the milk, and as a consequence the starch compounds are changed to sugar; the proteids are peptonized and the flavor mellowed. But it would seem to be a prodigious waste of energy if this ripening action was the only action of the milk and its enzyme contents.[11]

We do know, however, that this latex is the carrier of enzymes, and that in plant life certain enzymes play an important part in incorporating material for the growth of the living substance or of preparing material brought to it, so that it may be capable of such incorporation. Again, they bring about decompositions which

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[11] Assuming that there is at the lowest estimate, 100 ounces of latex in a tree, we would have twenty ounces of dried material capable of converting about 3,000 pounds of proteids.

supply the energy needed for the maintenance of vital processes. In other words, these enzymes digest and prepare food for plant life and growth.

J. Reynolds Green has shown that in the process of nutrition in plants, when the constructive processes are active, an excess of material is elaborated and deposited in temporary reservoirs. This material is utilized by a process of digestion brought about by the agents of enzymes or ferments which are formed to digest these deposited materials. From many plants we have been able to separate diastasic, proteolytic, glucosidal, emulsifying and other ferments.

The papaw is a plant of quick growth. It rapidly appropriates and converts decaying vegetation. Its best fertilizers have been found to be dead vegetable and animal matter, house waste, etc. This suggests that the presence of this abundance of enzymic power is necessary for the digestion and conversion of plant-food material, and that the material is prepared for incorporation in the living plant by the enzymes present in the latex.

The milky juice of the papaw can therefore be imagined as quite akin to the gastric or pancreatic juice of the animal organism. The ducts through which this latex flows are possibly digestive tracts; their contents, an emulsion of partially digested proteid and other material, under transformation preparatory to ultimate assimilation.

Corrosive Properties of the Latex.—The corrosive action of the latex has been recorded; all species have this property in some degree. Persons who handle the green fruit in the preparation of pickles are troubled with raw and bleeding fingers and are forced to abandon the work. The fresh latex will irritate the mucous membrane and its continuous use is in some instances very escharotic. This property seems more manifest in certain isolated plants of apparently the same species. This is true not only of the Carica papaya, in universal cultivation by the natives, but also in other varieties the fresh juice will blister and cauterize almost instantly. A caustic property is not unusual in many tropical plants. In the milk of the papaw it is not due to acid constituents, as it is still present if the slight acidity is neutralized. It can be removed by chloroform and ether, and is either removed or destroyed in some of the processes of separating the ferments (precipitation).

The corrosive constituent is not volatile and remains in the dried juice. An examination of many of the preparations sold in our market under the name of "papain," etc., shows that this corrosive property had not been altogether removed.

ANALYSIS OF PAPAW LATEX.[12]

This latex is an emulsion of fats and wax, containing also extractive matters, albumen and salts, as shown by the following:

CARICA LATEX—SUN-DRIED.

Moisture	6·06
Soluble ash	2·64
Insoluble ash	4·78
Matters soluble in water (including ash)	82·74
" " " benzine	11·43
" " " ether	9·77
" " " chloroform	11·20
" " " acetone	5·98
" " " alcohol	7·16

ASH.

Total ash	7·42
Soluble ash	2·64
Insoluble ash	4·78
Calcium sulphate—insoluble ash	0·896
Calcium phosphate " "	3·72
Silica " "	0·164
Calcium sulphate—soluble ash	1·024
Potassium, sodium, lithium, chlorides and carbonates—soluble ash	1·616
Chlorine	0·22
Ferric oxide	trace

Alcoholic extract (7·16 per cent.) is colored, astringent and has a somewhat acrid taste. The concentrated extract is dark brown, resembling well known solid extracts. Evaporated residue is only slightly soluble in ether and chloroform, but is partially so in a cold 5 per cent. solution of sodium hydrate. It is further dissolved upon heating. Alcohol added to this sodium hydrate mixture dissolves it completely. Acid added to the aqueous or alcohol alkaline mixture gives a saponification indicating resins.

Some observers have reported a glucosidal body in the Carica latex. The usual tests for such substances, when applied to this

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[12] Owing to the length of this paper, the detailed methods of analysis have been omitted. In most cases the methods were those in common use.

extract, give negative results. In my hands this extract gave no indication of tannin, although this substance has been reported as present in the milk. The acrid resins of the papaw are more or less extracted by alcohol, but more completely by acetone. The alcoholic extract is acid to litmus.

In this alcoholic extract the presence of an indicator was observed. When the extract is somewhat concentrated, the color becomes a beautiful pink which is destroyed by sodium hydrate, added to saturation, and upon concentrating the solution to dryness. The color is not restored by hydrochloric acid. (This color substance needs further study.)

Ether extract (9·77 per cent.) is nearly colorless, yielding upon evaporation a residue resembling white beeswax. This residue is quite soluble in chloroform, but only partially soluble in benzine or alcohol. (Soluble in hot alcohol.) The aqueous washings of this extract give an acid reaction with litmus and a precipitate with lead acetate.

Chloroform extract (11·20 per cent.) is colorless and slightly turbid. The residue, upon evaporation, is wax-like and hard (much resembling the residue from the ether extract). This residue is partially soluble in ether, and almost insoluble in alcohol and benzine. The aqueous washings from this extract give an acid reaction to litmus.

Acetone extract (5·98 per cent.) is of a yellowish color. The evaporation residue has a pungent, slightly aromatic odor and a dark brown color resembling the extract of plants. The residue is almost wholly soluble in alcohol, chloroform and amylic alcohol; but slightly soluble in ether, and insoluble in benzine.[13]

As the substances removed from the latex by volatile solvents were in the nature of material foreign to the enzyme, no systematic examination was made. These solvents do not seem to remove any proteid compounds save in the case of benzine, which extract gave a faint proteid reaction.

As a result of a rather hasty examination of these extractions, we may assume that they contain coloring matter; "vegetable extractive matter;" hard and soft waxes; hard and soft resins; a

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[13] The alcoholic and acetone extracts give slight indications of the presence of nitrogenous matter by the soda-lime process.

volatile resin; a substance of the nature of fatty acids; pectose compounds.[14]

WATER SOLUBLE CONTENTS.

The dried latex extracted by repeated washings with water gives 82·74 per cent. of matter, soluble to a clear greenish-yellow solution. This watery extract is of acid reaction and responds to the usual tests for the presence of proteids, such as Millon's reagent; the xanthoproteic and biuret tests, etc.; precipitates are formed by alcohol, tannin, picric acid, platinum chloride, metaphosphoric acid, lead acetate, Mayer's reagent, mercury bichloride, potassium ferrocyanid and acetic acid. The presence of several forms of proteid substances is also shown by the following:

The filtered solution (noted above) is rendered turbid by heating to the boiling point. Upon continued boiling a very fine precipitate is separated, though this is not abundant. Filtering and further boiling produces no further precipitation, but the addition of nitric acid drop by drop gives a heavy flocculent precipitate. The clear aqueous extraction noted above, slightly acidulated with hydrochloric acid and heated, shows a slight turbidity just before reaching the boiling point. Cooling and the further addition of the acid produces at once a heavy flocculent precipitate, which dissolves upon heating and reappears upon cooling.

A solution of sodium carbonate (0·5 per cent.) added to the clear aqueous extract of the dried latex produces an immediate turbidity which, upon heating, separates into a small amount of fine precipitate. From these last results it will be seen that the soluble albumins of the latex of the papaw are only partially coagulated by heat.

When concentrated hydrochloric acid is cautiously added to the clear watery extract of the latex, there is formed a heavy curdy precipitate, soluble in an excess of the acid. In a clear aqueous solution of the latex, concentrated nitric acid produces a heavy

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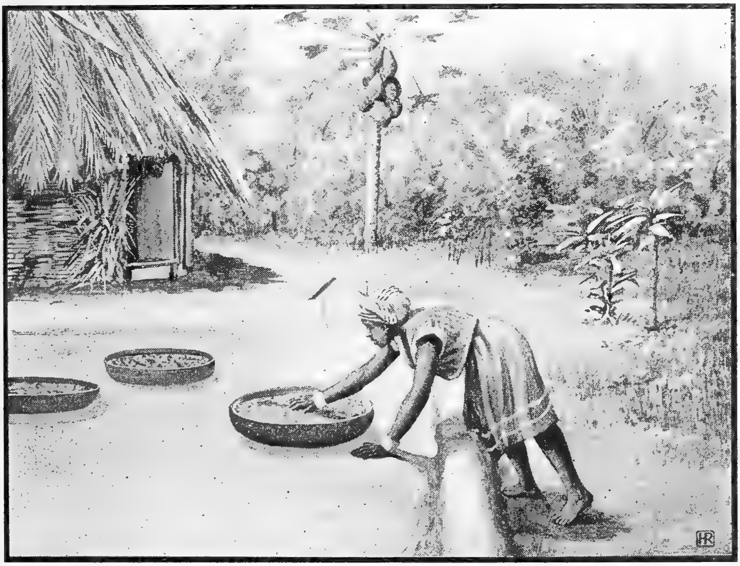
[14] Malic acid has been noted as being present in the latex of the papaw. The acid principles of these extracts of the milk when subjected to the usual tests for malic acid, gave but slight indications of its presence.

The aqueous solution of the latex was examined at length and judging by the reactions noted in the text-books, and compared with malic acid itself, the conclusion was reached that no malic acid or malates were present.

white precipitate, also soluble in an excess of the acid (proteid reaction). This precipitate turns yellow and dissolves upon heating (albumose), but upon cooling is again precipitated. Upon adding an excess of acid it is completely dissolved and not re-precipitated when cooled (globulin).

The presence of soluble globulin in an aqueous solution is further shown in that the precipitate produced by boiling is not soluble in hydrochloric acid (0·2 per cent.).

The residue left upon the extraction of the dried milk with water



Water method of drying latex of papaw.

is partially soluble in a weak solution of common salt, and the resulting solution gives a precipitate with nitric acid (globulin).

The watery solution noted above, when rendered slightly acid (acetic) and boiled, is made turbid, forming small amount of flocculent precipitate (globulin and albumin).

The clear watery extract of the papaw latex, when saturated with ammonia sulphate, gives an abundant white precipitate with strong proteid reaction (the precipitate carrying the greater portion of the ferment). The precipitate just noted, freed from the ammonium sulphate, dissolved in water, made acid with acetic

acid, and then saturated with common salt, gives a white flocculent precipitate (primary albumose). After saturation with ammonium sulphate, the filtrate gives a precipitate, deutero-albumose, and the supernatant liquid, under the biuret test, shows the presence of peptones.[15] If precipitated by soda-magnesium sulphate, the filtrate likewise exhibits a strong peptone reaction.[16]

ANALYSIS OF PAPAW PROTEIDS.

It cannot be said that any of the enzymes have been completely isolated. The most that can be urged is that the enzymes are either proteid in character, or are associated with proteid bodies. In all, or nearly all, attempts to separate the enzyme from the accompanying proteid, the result has been a destruction of enzymic power. Again, when in our manipulation of the enzymes we alter or destroy the character of the proteids which are associated with them, we alter or destroy the character of the enzyme. While it cannot be said that the enzyme and the proteid are identical, we must admit that the enzyme and proteid are most closely associated.

We have abundant authority to show that diastase is associated with leucosin; rennin is associated with hetero-proteose; bromelin appears in close relation to two forms of proteids, and so on through the list a close association of the enzyme with a proteid body can be shown. But it cannot be said that the proteid is actually the enzyme. So far as our present knowledge goes, an analysis of the proteid must stand for an analysis of the enzyme.

From the examination of the water-soluble contents of the latex of the papaw, we may reach the conclusion that the enzyme is associated with one or more of the soluble proteids. An analysis of these proteid bodies was therefore made, as follows:

For the purpose of analysis, a portion of the air-dried latex was extracted with alcohol, benzine and ether, to remove waxes, resins, etc., the residue consisting of the proteid matters and ash. This preparation is marked I in the accompanying table.

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[15] By the digestion of a solution of this peptone with the separated ferment or with trypsin, leucin and tyrosin appear (indicating hemipeptone).

[16] The classification of the albumoses and peptones is the subject of controversy. The classification here followed is that in most common use. Under another view we would have in this substance a mixture of globulin, proto and deutero albumose with, possibly, two or more forms of peptone.

A second preparation was made by extraction of the milk, as above, the product dissolved in water and the proteids precipitated by sodium chloride, and the precipitate partly freed from excess of salts, by dialysis:

This process was repeated with a view of obtaining an approximately pure preparation, and one representative of the enzyme of the latex. This preparation is marked II in the accompanying table.

PAPAW PROTEIDS.

	I. Per Cent.	II. Per Cent.
Air-dry.		
Carbon	39·96	42·81
Hydrogen	6·57	6·77
Nitrogen	11·26	10·09
Ash, or mineral matter	9·88	6·51
Moisture (loss at 100–105° C.)	10·83	7·90
Moisture-free.		
Carbon	44·81	46·84
Hydrogen	6·00	6·39
Nitrogen	12·62	10·95
Ash	11·07	7·06
Moisture-free, ash-free.		
Carbon	50·38	50·01
Hydrogen	6·74	6·87
Nitrogen	14·19	11·78
Oxygen	28·69	31·34
	100·00	100·00

The large proportion of mineral ash in the purest preparation—II—is notable and seems to indicate that the proteid constituents and the ash are most closely associated. Otherwise, we may observe that the carbon stands in about the same proportion as in other vegetable proteids. We have, however, a much smaller amount of nitrogen than is present in most proteids; but this low content of nitrogen is quite in accord with the constitution of some of the enzymes which have been examined. This is shown by the following comparison:

	Nitrogen. Per Cent.
Bromelin (Chittenden)	10·46
Trypsin (Kuhne)	13·41
Papaw (Kilmer)	11·78
Peptone (Henninger)	16·38

THE FERMENTS OF THE PAPAW.

The latex of the papaw is notable from the fact that it contains several soluble enzymes or ferments, or else (if such a thing is possible) a ferment body with a fourfold power. The ferments so far noted as contained in the latex are:

(1) A proteolytic ferment which decomposes proteids.

(2) A coagulating (rennet-like) ferment which acts upon the casein of milk.

(3) An amylolytic ferment having the power to attack starch, etc.

(4) A clotting ferment similar to pectase.

(5) A ferment possessing feeble powers of action upon fats.

The digestive action of the latex at the instant of its extraction from the green fruit is very marked. Placed in contact with such a substance as blood fibrin in a little water, the fibrin will be disintegrated before your eyes; mixed with milk and warmed, the milk is instantly coagulated. Boiled starch paste is thinned, and the blue color produced upon starch by iodine is changed to a purple in a few minutes. Poured over lumps of beef and placed in a warm place, the meat is softened, its fibres disintegrated, finally becoming a partially transparent jelly. The action upon cooked egg albumen is not so marked.

The latex when dried retains these powers in a somewhat lesser degree. I am of the opinion that the ferments exist in the latex, and possibly in the cellular structure, as a zymogen (carizymogen). This presumption is verified from the fact that after the extraction of the latex or pulp with water (preferably slightly acid or alkaline), a second maceration will bring a further yield of enzyme. I have repeated such a process ten times successively, in each instance bringing a further supply (small in amount) of the ferment into solution. If a considerable bulk of water (neutral, acid or alkaline) be added to the latex, and the resulting liquid be filtered and the residue on the filter paper washed with water, the greater portion of the ferment will be found in the filtrate.

The ferment may be extracted from the dried milk by water or glycerine (neutral, acid or alkaline), by very dilute alcohol (5-100); and from such a solution may be precipitated by any of the usual methods; such as an excess of full strength alcohol, saturation with alkaline salts, etc.

The following are the most important of the practical methods of separation. The first three are the methods of Peckholt:

(1) Exhaust the juice with ether; then exhaust the residue, first with absolute alcohol and next with 80 per cent. alcohol; the dried residue is then treated with water which dissolves it almost entirely, forming a turbid solution. The watery solution is finally precipitated with alcohol; the precipitate washed with alcohol, and dried over calcium chloride. Peckholt obtained by this process 7·848 per cent. of a white, light amorphous powder which he called "papayotin."

(2) Mix the juice with four times its weight of water; filter, and precipitate with alcohol (95 per cent.); wash and dry the precipitate. This gives 3·762 per cent. of a product practically the same as (1) but not quite so light.

(3) Evaporate the latex to dryness and then completely exhaust with ether and alcohol (absolute), as in the first method. Dissolve the residue in water and precipitate with alcohol. The result being a light brown powder of which Peckholt obtained 5·338 per cent. (He called this "parapayotin.")

(4) Wurtz prepared the ferment as follows: The milky juice was thrown on a filter and the coagulum washed with water. The aqueous solution then obtained was reduced to a small volume in a vacuum, and was precipitated by ten times its volume of alcohol. This precipitate was dried, dissolved in water and precipitated a second time with alcohol, washed with absolute alcohol and dried in a vacuum. The product of this process he called "papain."

(5) A method now in actual use in one of the West India Islands is as follows: Pour into the strained latex five times its volume of full strength alcohol, collect the precipitate and wash with absolute alcohol; dry over calcium chloride or sulphuric acid. (There is a considerable loss of alcohol; the product is small, fairly active, but high priced.)

(6) Method devised by the author: Dry the latex without heat; exhaust the dry residue first with ether, then with chloroform, followed by benzine; finally extract with alcohol. Under this process, if the extraction is thoroughly carried out, everything is removed except the proteids and ash. The product is a fine grey-white amorphous powder almost completely soluble in water, more active and more nearly representative of the peculiar properties of

the latex than the product resulting from any other method which has come under my observation.

(7) Salt-precipitation method. The well-known methods of precipitation by alkaline salts are applicable to the separation of the papaw ferments. The latex diluted with water or the dried latex extracted with water (filtered), when saturated with sodium chloride, with ammonium sulphate or with magnesium sulphate, will yield a heavy precipitate of the proteid contents carrying the greater portion of the ferments. Such precipitates may be freed from salts by subjecting their solution to dialysis, the resulting solution (and precipitated residue) are then to be evaporated to dryness.

The yield from these salt-precipitation methods is small, but, if the processes are carefully performed, furnish a satisfactory product, weaker however in action than those prepared by the method outlined in the preceding section.

Something like thirty methods for separation have been tried in my researches, with the result that all methods where precipitation is involved, tend to weaken the digestive power of the ferment. The methods used in the separation of pepsin whereby a purified and high power pepsin is produced, are as follows: Digestion of the proteid constituents, precipitation and purification of the product do not seem to be applicable to the papaw.

If the proteids of the papaw are digested by the aid of the contained ferments in either acid, neutral or alkaline fluids, and a separation and purification then made, the resulting product is decreased, and the digestive power is not increased; in fact, unless the process is most carefully performed, the absolute power of the ferment is greatly weakened.

It has been stated that the ferments of the papaw are chiefly associated with one of its proteid constituents.[17]

I have never been able to verify this statement. When any of the various forms of proteids are separated by the processes elsewhere outlined, heat or coagulation excepted, the separated body will be found to possess ferment power. Even the peptone remaining after separation of the albumoses exhibits feeble ferment powers. The ferment action seems to be the most marked when all of the proteids are associated together in their natural form.

(*To be continued.*)

[17] Martin believed the ferment to be associated with the proteid which he termed B Phytoalbumose.

THE "HOFMANN HAUS."

BY H. V. ARNY, PH.D.

On October 20, 1900, the German Chemical Society dedicated, with appropriate ceremonies, the magnificent building erected in Berlin as a memorial to the great pioneer in the aniline industry and the famed teacher of chemistry, A. W. von Hofmann.

The building, designed as a home for the German Chemical Society and kindred organizations and as a hospice for sojourning foreign chemists, is located at Sigismundstrasse 4, and is a four-storied fire proof structure with a twenty-two meter front of Silesian sandstone, with two ornamental iron bow windows projecting from the second and third stories respectively, and with a red-tiled mansard roof. The ground floor is occupied by janitor's quarters and by a research laboratory. The second floor front contains offices of the society, while the third floor front is devoted to the library and committee rooms.

The rear part of the building is given up to an assembly hall, contains 254 seats arranged in tiers, rising level with the third story, the lecture counter being flush with the second floor. The top floors of the building are fitted up as offices and as store buildings. The entire edifice is lighted with electricity, contains an electric elevator and is heated with hot water. This structure and the lot on which it stands represents an expenditure of 575,000 marks.

A full account of the enterprise was contained in a special issue of the *Berichte* of the Society, published at the beginning of this year, and from it we can glean several lessons of value in the consideration of the proposed Procter Memorial. The figures will be given, as in the original, in German Reichsmarks, the equivalent in dollars being easily reckoned by dividing by four.

The financial commencement of the enterprise was the occasion of Hofmann's seventieth birthday, when his admirers raised a purse of 39,000 marks. Seven thousand marks of this was expended on a bust of the master; the remaining 32,000 marks being handed Hofmann as a jubilee purse. The recipient, with his characteristic generosity, augmented the amount with 8,000 marks of his own means and returned it to the committee with the request that it be called the Hofmann fund and used for the advancement of chemical science.

Hofmann died May 5, 1892, and immediately the German Chemical Society decided on a memorial to the eminent chemist, using the Hofmann fund, which, during the four years, had grown to 65,000 marks, as a nucleus.

The first call for subscriptions was dated November 12, 1892, and in response, 85,000 marks were subscribed by December 1st of same year. From then until October 1, 1893, 79,000 marks more were collected and during the ensuing fifteen months, up to January 1, 1895, additional subscriptions amounting to 12,000 marks were received. On May 12, 1896, three and a half years after issuance of the original appeal, the committee reported that the subscriptions and interest on same amounted to 176,000 marks.

The committee, having planned a memorial costing 800,000 marks, though sorely disappointed at the apparent failure of their hopes, renewed their efforts and succeeded during the next six months in bringing the fund up to 229,000 marks.

In December, 1896, they purchased a site for the building for 275,000 marks, covering the deficit by drawing on the original Hofmann fund. They then formed a stock company, capitalized for 300,000 marks, for the erection of the building, issuing bonds of 5,000 and 10,000 marks value, bearing 3½ per cent. interest. These bonds were bought by German chemical corporations and others, and of the 300,000 marks thus subscribed, bonds amounting to 140,000 marks were returned to the corporation, all claims of payment of both principal and interest being waived by the generous subscribers, on occasion of the dedication of the building.

This leaves a debt of 160,000 marks, secured by a mortgage on the property, and which it is hoped will be paid off by legacies. One such has been announced—Commercienrath J. F. Holtz, Treasurer of the German Chemical Society and the most indefatigable member of the memorial committee, having expressed the intention of giving 30,000 marks.

The interest on the bonds will be met by the rental on the property paid by the several organizations having their home in the building.

An analysis of the subscription list may prove interesting.

The total amount, 236,751 marks, was obtained from 1,350 subscribers, whose gifts ranged from 20,000 marks to 50 pfennig (12 cents); 244 contributors furnishing 221,850 marks.

The several large donations are as follows, the names of the donors known on this side of the water being given in brackets. These do not include the cancelled bonds of 10,000 and 5,000 marks each, total 140,000 marks contributed by nineteen persons. Besides these there were two gifts of 20,000 marks each, from two dyestuff corporations; one of 10,000 marks, four of 6,000 marks (Fahlberg and Tiemann); six of 5,000 marks; five of 3,000 marks (Bayer of Elberfeld); two of 2,500 marks, eight of 2,000 marks (Bayer of Elberfeld, Schering of Berlin, Fischer of Berlin); eight of 1,500 marks (Schering); twenty-seven of 1000 marks (German Soda Works, German Solvay Works, German Explosive Works, Kalle of Biebrich, Knorr, Pintsch and Siemens of Berlin); two of 800 marks; five of 600 marks; thirty-one of 500 marks; four of 400 marks; fourteen of 300 marks; five of 250 marks; twenty-nine of 200 marks, and ninety of 100 marks. It may be interesting to note that a collection was taken up in practically every chemical laboratory in Germany, thus giving each student an opportunity of contributing his mite.

Among special contributions not enumerated above may be mentioned a gift of 7,000 marks for fitting up the library, from Professor Harries of Berlin; a large number of books and apparatus from various German firms in that line of business; a marble statue of Hofmann, for which fifty-seven subscribers donated 14,475 marks; and Hofmann's library, given by his widow.

In conclusion, it will be seen that the raising of funds necessary for so expensive a structure as the "Hofmann Haus" was accomplished only after herculean efforts, it taking eight years to collect 376,000 marks and even then there is left a debt of 160,000 marks. Let those in charge of the Procter Memorial bear this in mind and let them therefore plan more moderately than did their German confrères.

On the other hand, if the German chemical interests freely gave 236,000 marks for a memorial possessing largely the nature of a club house; there seems no reason why the American drug trade should not raise $50,000 for an undertaking of such far-reaching importance as a research laboratory.

PUMPKIN SEED OIL.

By Willard Graham, P.D.

Pumpkin Seed Oil as found in commerce varies in quality and is generally, if not always, obtained by the use of a solvent. The expressed oil is not used to any great extent, as the extracted oil is cheaper.

A quantity of whole seeds were ground and extracted with acetone; the acetone being recovered by distillation. The yield was 25 per cent. of an oil having the following properties:

A clear reddish limpid liquid having an agreeble odor and taste, a specific gravity of 0·9208 at 15° C., saponification number 192·5, acid number 18·9, ether number 173·6, soluble in all proportions of carbon disulphide, ether, chloroform and in twenty parts of absolute alcohol, drying on standing to a tough yellowish transparent mass.

A commercial oil was obtained and on examination gave the following results:

A clear reddish liquid of an agreeable odor and taste, having a specific gravity of 0·9197 at 15° C., saponification number 195·2, acid number 3·5, ether number 191·7, soluble in all proportions of carbon disulphide, ether, chloroform, and in twenty parts of absolute alcohol.

The above oils having been obtained by extraction it was deemed desirable to examine an oil obtained by expression, but after subjecting a quantity of ground seeds to a pressure of 3,000 pounds, no appreciable quantity of oil was secured on account of the porous condition of the seeds.

Benedikt and Lewkowitsch in their "oils, fats and waxes" describe it as an oil expressed from the seed of *Cucurbita Pepo*, specific gravity at 15° C., 0 9231, saponification number 188·1, iodine value 121, solidifying point—15° C., melting point of mixed fatty acids 28° C.

Carvone Content of Volatile Oils.—According to Kremers (*Jour. Soc. Ch. Ind.*, January 31, 1901,) the determination of the carvone content of volatile oils, containing this ketone, as carvoxime, while by no means perfect, is unquestionably a step in the right direction, the one great advantage being that a definite crystalline compound is weighed.

THE LLOYD REACTION FOR MORPHINE.[1]

BY JOSEPH L. MAYER, Phar.D.

Contribution from the Chemical Laboratory of the Brooklyn College of Pharmacy.

Since the publication of the installment of Professor Lloyd's "Stringtown on the Pike," which had to do with the trial scene, tests and results, the journals have contained in almost every issue contributions which in one way or another relate to the well-known bichromate-sulphuric, strychnine reaction.

Prominent among those who have contributed articles on the subject is Mr. Seward Williams, who in the April number of the *Druggists Circular* elaborates his previous discussion concerning the possibility of mistaking a morphine-hydrastine mixture for strychnine.

He concludes that "the moral of the story is not to place too much reliance on any one of the generally recognized evidences of organic poisons."

In going over the reactions he finds that the morphine-hydrastine mixture with a few drops of concentrated sulphuric acid, will, even in the absence of potassium bichromate, produce the violet-blue color which so nearly simulates the characteristic strychnine reaction that Professor Lloyd yielded to the temptation to make it the theme of one of the most powerful climaxes of his deservedly popular novel.

As a consequence Mr. Williams proposes that "we shall add to our list of alkaloid color-tests the two just mentioned and know them as the Lloyd reactions for morphine and hydrastine, if agreeable to Professor Lloyd."

If the unknown substance is suspected to be morphine, add a small a mountof hydrastine and a few drops of concentrated sulphuric acid; a violet-blue color appearing after five minutes indicates morphine.

If hydrastine is suspected, add to the sample a small amount of morphine and a few drops of concentrated sulphuric acid; a violet-blue color after five minutes indicates hydrastine.

As a matter of fact, modern methods followed in toxicological

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[1] Read at the annual meeting of the New York State Pharmaceutical Association, June 4-8, 1901, and communicated by the author.

analysis have so taken advantage of the solubility of the alkaloids in the solvents employed in their separation, that even if some color reactions are common to several alkaloids, unless these alkaloids are separated in the same step in the examination, the chances of error are minimized.

It is the possibility of making an error that emphasizes the necessity of having an unlimited number of tests of identity. Experiments recently made, prove that chloroform will dissolve out of a solution sufficient morphine and hydrastine to react violet-blue with concentrated sulphuric acid and potassium bichromate.

While it is true that the reaction differs from that obtained with strychnine in persisting some time, instead of being evanescent, it is plain to see how a mistake might easily be made.

Had "Professor Drew," the chemist in "the Stringtown poisoning case," been more observant, and applied other tests than the bichromate one, his testimony would not have supplied the powerful link it did, in the prosecution's strong chain of circumstantial evidence. Tests of identity and confirmatory ones are not only necessary in examinations of this character, but are required by the pharmacist to enable him to identify the alkaloids he purchases and dispenses. For example, the United States Pharmacopœia requires that quinine "should not produce a red color with nitric acid (difference from morphine)."

These facts suggested to the writer, that if hydrastine when mixed with any alkaloid other than morphine, in the presence of concentrated sulphuric acid, after five minutes' stirring failed to produce the violet-blue color, the reaction would be a valuable addition to the tests for differentiating morphine from other alkaloids.

The following are the results of the experiments I made to determine this question.

The conditions and method of applying the tests were alike throughout, and consisted in mixing approximately one part of hydrastine with eight parts of the other alkaloid.

After the addition of a few drops of concentrated sulphuric acid the mixture was stirred with a glass rod for at least five minutes. In view of the fact that many alkaloids give colorations for the first few minutes which are totally different from the end reaction, the direction to "stir at least fives minutes" must be strictly observed.

The alkaloids operated upon, those most likely to be found in the drug store were the purest obtainable.

The following table gives the colors produced by stirring the alkaloids named with hydrastine and concentrated sulphuric acid for five minutes:

Aconitine	Brown.
Atropine	Pinkish.
Berberine	Greenish-brown.
Brucine	Light-brown.
Caffeine	Dirty-white.
Cinchonine	Dirty-yellow.
Cinchonidine	Dirty-white.
Cocaine	Unaffected.
Codeine	Pinkish.
Digitaline	Mahogany.
Heroin	Violet to purple.
Homatropine	Pale-yellow.
Hyoscyamine	Dirty-white.
Morphine	Violet-blue.
Pilocarpine	Light-brown.
Quinidine	Light-green.
Quinine	Greenish-yellow.
Sparteine	Greenish-yellow.
Strychnine	Dirty-white.
Veratrine	Royal purple.

An analysis of these results shows that but three out of the twenty samples examined give a violet-blue color under the above conditions, viz., heroin, morphine and veratrine.

Among this number only one gives a cherry-red color with cold concentrated sulphuric acid, viz., veratrine.

The remainining two are differentiated by nitric acid; an orange-red color indicates morphine and a yellow color heroin.

When we consider the sharpness of the reaction with the simplicity and ease of application, it becomes apparent that Lloyd's test for morphine is one worthy of a place among the alkaloidal color reactions.

Fully realizing the importance attaching to the necessity of subjecting as many alkaloids as possible to the test, the writer regrets exceedingly that the number at his disposal was so limited, but hopes in the near future to report on those not included in the present work.

THE ANISEED OILS, AND ANETHOL[1]

By George R. Pancoast, M.D., and Lyman F. Kebler, Ph.C.

Aniseed oil is one of the oldest of essential oils known, having been observed as early as the sixteenth century. On account of its being a grateful aromatic and a mild carminative it has received general recognition by the various pharmacopœias. The 1880 U.S.P. recognized, and the 1898 Br. Phar. at present recognizes, both the oils distilled from Anise and Illicium. The former states that Oil of Illicium has nearly the same properties as oil of Anise, except that it congeals at about 2° C. while the latter recognizes a difference in the solubility in alcohol. The 1890 U.S.P. recognizes only the oil distilled from *Pimpinella Anisum* L. (Nat. Ord. Umbelliferae). Why this restriction has been made is not apparent. The plant originally came from Egypt and the Levant, but on account of its usefulness, importance, and ease of production, it is now cultivated in nearly all parts of the world. Russia at present is the largest producer of oil, not solely because it grows the greatest quantity of seed (about 3,000 tons annually) but rather because the seed is of inferior quality and is of little value except for oil. Spain has of late years produced about 1,500 tons per annum, and Turkey not far from this amount; but these two countries produce large, pure seed of such fine quality as to commercially preclude its use for oil.

Seed from various sources will yield from 1½ to 6 per cent. of oil. In some localities, stems, chaff and even the leaves are added to the fruit before distillation. Chaff yields about ½ per cent. of oil.

The physical properties of aniseed oil have been thoroughly investigated and are as follows; at, or above 20° C. it is a colorless or pale yellowish, strongly refractive liquid, of a characteristic odor and sweetish, mildly aromatic, taste. At or about + 15° C. it solidifies into a snow-white crystalline mass, called by some "flat tablets" and again becomes completely liquid at from + 18 to + 20° C. An oil that requires a temperature below + 15° C. for congealing should be looked upon with suspicion. The specific gravity of a fresh oil is 0·980 to 0·990 at 17° C. increasing with age; due to the

[1] Read before the Pennsylvania State Pharmaceutical Association, June, 1901, and communicated by the authors.

formation of anisaldehyde, anisic acid and polymeric anethols. The plane of polarized light is turned slightly to the left up to 1° 50 minutes. It is clearly soluble in an equal volume of alcohol and the resulting solution should not assume a blue or brown tint on the addition of a drop of solution of iron chloride (absence of phenol). With age the oil becomes more readily soluble in alcohol.

The principal constituents are anethol, 80 to 90 per cent., and methylchavicol, an optically inactive body having the odor of aniseed oil, but lacking its sweet taste.

For the various adulterants found from time to time and methods of detecting the same, see a former paper by the authors, in AMERICAN JOURNAL OF PHARMACY, 73, 1, entitled "Adulterations of Essential Oils."

Before taking a sample for examination, the contents of the can should be thoroughly liquid and well agitated so as to get a representative sample.

Aniseed oil, it is said, can only be distinguished from star anise by the odor and taste. Various other distinguishing tests have been suggested, but none have proved satisfactory. It is probably due largely to the close similarity of the two oils, and the difference in price, that the former has been largely displaced by the latter; which is derived from the fruit of Illicium verum, H. (Nat. Ord. Magnoliaceae). The new German Pharmacopœia has met the existing conditions very well in that it recognized neither of the oils, but their chief constituent, anethol. Whether such a step is a good one, time alone can tell.

Star anise oil is practically controlled by the Chinese. At the source of distillation it is placed into tin cans holding from 32 to 35 catties (42 to 46 pounds) and shipped to Hong Kong or other prominent markets, from whence it is sent out in lead canisters holding 7½ kilos. Some of the star anise oil is sent through Tonquin, the French centre of distribution. The construction of the canisters is not the most convenient, for readily emptying, without loss. The following precedure works very satisfactorily. Cut a round hole into the centre of the canister, through the seal, make this opening perfectly smooth and round by means of a reamer; into this opening insert a double perforated cork, carrying in one opening a siphon-shaped glass tubing, of suitable size and length, armed with a piece of rubber tubing at both ends, the rubber piece inside the container is about an inch long, and the one outside a foot

long. Into the other opening insert a straight glass tube. The apparatus is now ready for use. Slightly elevate the canister, place a receiver under the long rubber tubing and start the siphon by blowing into the short glass tube. The canister is thus quickly emptied without loss. The small quantity of oil remaining, can readily be removed by draining.

The physical properties of this oil are about the same as those for aniseed, the slight variations having been noted above.

The composition of star anise oil appears to be somewhat more complex than that of anise oil.

Many adulterants have been reported by the various investigators, but at present only those of a more scientific character are met. Kerosene seems to have been used largely at one time, but the writers never met with any in this oil. It might be interesting, however, to record a few observations made with this adulterant.

Schimmel's Report, April, 1897, p. 38. contains the following:

	Specific Gravity at 15° C.	Congealing Point.	Solubility in alcohol.
Pure Oil	0·986	+ 18° C.	Soluble in 2·2 and more parts
Oil + 5 per cent. kerosene	0·978	+ 16¼° C.	Not soluble in 10 parts
" + 10 " " "	0·970	+ 14¾° C.	" " " "

J. C. Umney reported the following observations; *Chem. and Drug.*, Vol. 51 (1887), p. 623:

	Specific Gravity at 15° C.	Congealing Point.	Contained.
1	0·894	+ 5·7° C.	56 per cent of Kerosene
2	0·926	+ 9·7° C.	37 " " "
3	0·939	+ 11·5° C.	36 " " "
4	0·920	+ 8·8° C.	41 " " "
5	0·910	+ 7·8° C.	47 " " "

The above data were obtained from star anise oil of the London market.

The authors have recently examined a number of samples of the various aniseed oils offered as pure, with the following results:

Source.	Specific Gravity.	Optical Rotation.	Congealing Point.	Solubility in equal volume of alcohol.
1 Russian	0·9838 at 17° C.	+ 3° 50′	+ 15° C.	Soluble
2 "	0·9893 " 20° C.	— 4° 59′	+ 18° C.	"
3 Tonquin . . .	0·9834 " 17° C.	— 1° 30′	+ 17° C.	"
4 Star Anise . .	0·9648 " 17° C.	— 1° 27′	+ 15° C.	"
5 " . .	0·9870 " 17° C.	+ 0° 58′	+ 16° C.	"
6 " . .	0·9822 " 17° C.	— 1° 53′	+ 15.5° C.	"
7 " . .	0·9821 " 17° C.	— 1° 31′	+ 14·5° C.	"
8 " . .	0·9832 " 17° C.	— 1° 44′	+ 14° C.	"
9 " . .	0·9832 " 17° C.	— 1° 44′	+ 14° C.	"

Oils Nos. 1 and 2 have undoubtedly been tampered with. The disturbed optical rotation of No. 1 is probably due to added oil of fennel, or some of its derivatives. What the disturbing factor of No. 2 is, the authors are unable to conjecture. No. 8 is also abnormal, due probably to the same added impurities as No. 1, or possibly added star anise leaf oil, which has a specific gravity of 0·9878 at 15° C. and an optical rotation of + 1°. The anethol content of star anise leaf oil is small, and the congealing point correspondingly low. It has been called "Liquid star anise oil" and has no practical value, except as an adulterant.

Oils are occasionally met with, having a low congealing point, yet are not adulterated. These are the "Flower Oils." They are obtained from a mixture of natural and artificially ripened seeds; *i. e.*, the branches are gathered before the fruit is all ripe so as to hasten the ripening of the green seeds. Such oils cannot be considered equal to an oil made entirely from prime seed.

ANETHOL.

The present German Pharmacopœia describes anethol as a colorless, highly refractive liquid, of a pure anise odor, and of intensely sweetish taste; specific gravity at 25° C. 0·984 to 0·086; melting point, + 20° to + 21° C.; boiling point 232° to 234° C. and must form a clear solution with two parts of alcohol.

Several samples examined by the writers yielded:

	Specific Gravity.	Optical Rotation.	Congealing Point.	Boiling Point.
A.	0·9895 at 20° C.	inactive	+ 17° C.	210–235° C.
B.	0·9896 at 20° C.	— 1° 30′	+ 20° C.	220–235° C.
C.	1·0525 at 15° C.	— 2° 18′		228–245° C.
D.	0·9870 at 20° C.	+ 5° 22′	+ 20° C.	229–236° C.
E.	0·9847 at 20° C.	inactive	+ 19° C.	210–235° C.

All are soluble in an equal volume of alcohol. A, B and E are of fair quality and comply fairly well with the above requirements, but anethol is generally considered optically inactive. C and D were labeled liquid anethol. We are informed that this is a redistilled oil of anise, prepared from the regular anise oil of the market. Liquid anethol is therefore a misnomer. It is desirable here to remark that C was an old sample and its original physical properties may have changed. D appears to be "anethol" derived from oil of fennel.

LABORATORY OF SMITH, KLINE & FRENCH CO.

CORRESPONDENCE.

WOOD ALCOHOL.

Editor AMERICAN JOURNAL OF PHARMACY:

Permit me a word on the use of wood alcohol for heating purposes, spoken favorably of in a recent number of the JOURNAL. Unquestionably methyl alcohol is a cheaper fuel than grain spirit. It costs less and generates, weight for weight, more heat. However, its use is attended sometimes with inconveniences that must be taken into consideration. From its greater volatility it is even more dangerously inflammable than ordinary alcohol. On account of this volatility, also, there is much greater waste in its use, the loss from evaporation in storing being more considerable and control of the rate of combustion in ordinary spirit lamps being more difficult.

When burned in the safety spirit lamps, in which the fluid is absorbed by asbestos covered by brass wire gauze, the metal of the gauze is rapidly corroded, as shown by the deep green or blue color imparted to the flame, and a brass kettle heated over the flame becomes quickly tarnished. As a fuel, therefore, for use at the tea table, wood spirit cannot be recommended, at least where brass utensils are employed.

A. B. LYONS.

PROCTER MEMORIAL.[1]

In response to a letter from the Editor of this JOURNAL concerning the feasibility of establishing a Research Laboratory as a memorial to the life and work of Prof. William Procter, Jr., by the American Pharmaceutical Association at its semi-centennial in 1902, the following are some of the replies which have been received:

DEAR SIR:—In a former communication I expressed the idea that some monument in memory of William Procter, Jr., would be the most appropriate memorial of his life and work. If he could have been consulted about the matter he would have said, "Let it be a Research Laboratory," and so, perhaps, we owe something to his known preferences. If the necessary funds can be obtained and arrangements made for the permanent maintenance of a research laboratory, it seems to me it would be a most fitting monument to

[1] For other information and correspondence on this subject, see November, 1900, and February, March, April, May and June issues of this JOURNAL.

his memory. I can see a number of difficulties that will have to be overcome in the conduct of such an establishment, but without doubt these can all be overcome.

The Faculty and Directors of the Philadelphia College of Pharmacy would, it seems to me, be the proper persons to be entrusted with the carrying out of this project by reason of his association with its early history, and Philadelphia being the city in which his life-work was done; and I see no reason why a national monument should not, in this way, be cared for by the mother of all the colleges in the United States.

W. M. SEARBY.

SAN FRANCISCO, CAL.

DEAR SIR:—Replying to your letter of April 4th, in which you state that it may be possible to establish a research laboratory at the fiftieth anniversary of the A.Ph.A., I have to say that I am greatly pleased at this outcome of the discussion, and if there is anything I can do to further the scheme by encouraging sentiment in favor, I should be very glad. I hope that the research laboratory will include various kinds of pharmacological work, will not confine itself to strictly chemical study, but will embrace physiological pharmacology, which has grown to be so important to the physician especially, but to the pharmacist as well.

Anything that we can do in this laboratory on the broad lines of medical and pharmaceutical science for the benefit of human society, should meet with hearty approval, and should have the co-operation of all interested in medical science in any of its branches.

L. E. SAYRE.

LAWRENCE, KAN.

DEAR SIR:—Your agreeable communication of recent date, relative to the project of a *Procter Memorial*, and asking for an expression of opinion thereon, has been duly considered, and we beg to state as follows:

Believing, as we do, in a glorious future for American pharmacy, and in the eminent value of the instrumentality of the American Pharmaceutical Association in promoting that consummation, we quite agree with the proposition conveyed in your editorial in the AMERICAN JOURNAL OF PHARMACY of November last, that the fiftieth anniversary of the Association be commemorated by some act of

historic significance, worthy and expressive of the high mission of that organization.

Recognizing also the distinctive prominence of the late Professor Procter as a pioneer, guide and leader in the evolution of pharmaceutic science and practice on this continent, we deem it likewise proper that the above-indicated commemorative act should bear his name and thereby serve to perpetuate and honor his memory.

As to those forms suggested for this Memorial, on the feasibility of which no doubts have been expressed, we incline to side with the view variously supported in your correspondence columns, that neither the Statue nor the Medal plan would be sufficiently reminiscent of the modest bearing, assiduous toil, and self-denying devotion to a noble cause, which characterized the great pharmacist whom it is desired to honor. In what we are informed to have been *his* spirit, the General Scholarship plan would, among the admittedly practicable suggestions so far put forth, appear to us to claim first place.

MERCK & CO.

NEW YORK CITY.

DEAR SIR:—Replying to your esteemed favor of the 5th inst., relative to "memorializing the life and work of Prof. William Procter, Jr.," it seems to me we should try to combine sentiment with utility. Sentiment, to satisfy the desires of the heart towards one we love and have lost, and utility, to perpetuate the memory of the departed.

In the lecture room, where he was wont to teach, to give up the best part of the results of his untiring labors among those he loved and was loved by—there, where the happiest and best years of his life were spent, let there be erected a beautiful white marble tablet, bearing "en relief," a bronze (bust size) profile, elegantly done—true to life—with a proper dedication embodying his worth as a man, pharmacist and friend; also the affectionate regard of those (students, etc.) erecting said tablet—so much for the sentiment portion—a just tribute to a great and good man, upon the spot of his well-earned honors.

Now, as to the utility portion—every year, let there be conferred, jointly by members of the A.Ph.A. and Philadelphia College of Pharmacy—a free tuition, in the name of Prof. William Procter, Jr., for the degree of pharmacist (Ph.G.) in the Philadelphia College of

Pharmacy, upon some worthy lad who lacks the means. * * * I think Prof. William Procter, Jr., would have been well pleased with this.

The research laboratory idea is all right, but it had better be left to those with unstinted means; this is more a labor of love than vain glory and should be made up of contributions like unto the widow's mite.

We want something simple, impressive and lasting, dignified and true to the purpose. Anything involving a large expenditure will either not be realized or only create an opening for would-be geniuses. . Prof. William Procter, Jr., and his memory would be lost in the refulgence cast by the halos around the heads of "Research Laboratory" workers.

Let us love and honor the man for his many cardinal virtues, but in such a way that his, and only his, memory get the full benefit. I have no use for these double-edged schemes, which are like unto the Spanish proverb which says: "He who asks for God, asks for two." (A reference made to the pious monks asking charity.)

BROOKLYN, N. Y.

E. FOUGERA.

RECENT LITERATURE RELATING TO PHARMACY.

BACTERICIDAL ACTION OF PAINTS.

Cultures of various pathogenic bacilli—such as those of diphtheria, cholera and typhoid—transferred to freshly painted surfaces of wood, tinplate and earthenware, and observed under various conditions of time and temperature, were destroyed in every case, as shown by the inability to produce new cultures from the experimental material. That the destruction was not due to chemicals was shown by the fact that the same cultures thrived in 1 per cent. solutions of magnesium chloride and of arsenous acid.

The writer, noting that linseed oil paints were the best germicides and also that all such paints, on drying, react to ozone paper, concludes that the antiseptic action of paints is due to the formation of ozone in the oxidation of drying oils. (M. Piorkowski, *Bericht. dtsch. Ph. Ges.*, 1901, 85).

H. V. ARNY.

FUNGICIDAL ACTION OF VOLATILE OILS.

Interesting to compare with above is an article by T. Borkorny (*Ph. Cent.*, 1901, 159, and 172) in which he reports elaborate experiments on the destruction of mould (Schimmelpilz) and putrefaction bacteria with ethereal oils and their derivatives, drawing therefrom interesting conclusions as to chemical structure and relative toxicity. Quoting Loew's classification of toxicological action, in which he assumes that death of organisms by poison is due to the chemical decomposition of the protoplasm—be it by complete dissociation, or by formation of substitution products.

The writer cites the following oils as most toxic to mould, deducing the reason for toxicity from their chemical structure.

First comes *eugenol,* a phenol, and all phenols form substitution products with the protoplasmic constituents. It likewise contains an allyl group—$CH = CH_2$, and all unsaturated groups are more poisonous than the corresponding saturated body. Thus allyl mustard oil is much more toxic than ethyl mustard oil. Second in antiseptic nature is *cinnamic aldehyde*, $C_6H_5CH = CH$ CHO, which is toxic because of its CHO group. Aldeyhdes are more toxic than their corresponding alcohols (note antiseptic action of formaldehyde, as compared to its congener, methyl alcohol) because, according to Loew, they react with the amido groups found in the protoplasm. Cinnamic aldehyde, moreover, contains the unsaturated group—$CH = CH$—which contributes to its toxic action. *Salicylic aldehyde*, C_6H_4CHO, is more toxic to fungi than its alcohol, saligenin, or its oxidation product, salicylic acid, again showing influence of the aldehyde group. Lastly, all bodies containing the phenyl group, C_6H_5, show more toxic character than corresponding substances of the marsh gas series. H. V. A.

CLARIFICATION OF ALBUMINOUS URINE.

The clearing of urine prior to testing for albumin is sometimes difficult, and such foreign bodies as magnesia, aluminum hydrate, red lead or talc, have been recommended for the purpose. All, however, carry down considerable albumin, hence are not advised. Infusorial earth is the least objectionable clarifying agent, and even this should be used in small amounts only, not exceeding ½ per cent. After all, shredded filter paper is the most reliable clarifying agent.—(Dr. Grützner, *Ph. Zt.*, 1901, 78.) H. V. A.

POISONOUS STAR ANISE.

C. Hartwich (*Schw. Wochenschr. Ch. und Ph.*, 1901, 107) finds star anise of Swiss commerce contains 10 to 20 per cent. of the poisonous fruit of Illicium religiosum. He calls attention to the means of detection suggested by Lenz. (See this JOURNAL, 1900, 75). H. V. A.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A HANDBOOK OF MATERIA MEDICA, PHARMACY AND THERAPEUTICS, including the posological action of drugs, the special therapeutics of disease, official and practical pharmacy, and minute directions for prescription writing. By Samuel O. L. Potter. Eighth Edition, Revised and Enlarged. Philadelphia: P. Blakiston's Son & Co. The new edition contains 950 pp. octavo. Price, in Cloth, $5 00; in Sheep, $6.00.

This well-known, comprehensive and commendable work has again been subjected to a thorough and critical revision, has been largely rewritten, and has been expanded by the introduction of much new matter. The latter has to some extent taken the place of material considered obsolete or comparatively unimportant, so that the increased size of the book over the previous edition is only twenty pages.

In the section on Materia Medica the following articles have been rewritten: Argentum, Cinchona, Coca, Coffea, Digitalis, Dulcin, Ergot, Ferrum, Ipecacuanha, Myrrha, Saccharinum and Veratrum Viride. The new matter includes paragraphs on Actol, Airol, Argentamin, Argentol, Argonin, Chinosol, Creosotal, Dionine, Eucaine, Eudoxin, Glycero-phosphates, Heroine, Holocaine, Iodothyrin, Itrol, Largin, Nesophen, Orphol, Orthoform, Passiflora, Pellotine, Peronine, Phloridzin, Piperidin, Protargol, Tuberculin-R, Urotropin and Xeroform.

In the section on Therapeutics new articles are inserted on Local Anesthesia, Beriberi, Dhobie Itch, Tropical Fevers, Heat-stroke, Hemoglobinuric Fever, Lymphadenoma, Miliaria, Bubonic Plague, Sprue, Tinea Imbricata, Tinea Versicolor and Toxemia. Twenty-eight articles in this portion of the book have been rewritten, including those on Amenorrhea, Asthma, Boils, Cholera, Diabetes, Dysentery, Dyspnea, Gonorrhea, Insomnia, Leprosy, Leucocythemia, Lichen, Myxedema, Pemphigus, Phthisis, Remittent Fever, Typhoid

Fever, Septicemia, Shock, Suppuration, Ulcers, Uremia, Variola and Wounds. The text of many other articles has been expanded by the incorporation of more than two hundred items from current medical literature and from the author's personal experience in practice. The articles on Poisoning, on Temperature in Disease, and on the Clinical Examination of the Urine have been transferred to this part of the book from the Appendix, in the belief that they will be more frequently consulted when found in their alphabetical order in the section on Therapeutics.

Potter's Handbook is one of those works that contains a vast amount of information and is teeming with the results of the author's own personal experience and operations. The present edition contains material gathered from the writer's experience in active professional practice in a tropical climate, among soldiers and civilians, men, women and children, during a period of nearly two years' duration. The book is of great value to medical students and physicians and will be found also a valuable reference book by pharmacists and dentists as well.

MERCK'S 1901 MANUAL OF THE MATERIA MEDICA. A ready reference pocketbook for the practising physician and surgeon. Compiled from the most recent authoritative sources and published by Merck & Co., New York and Chicago.

This handy little book of nearly 300 pages contains a vast amount of information regarding the physical and chemical properties, physiological effects and therapeutics, uses of drugs, as well as a formulary of well-selected prescriptions and a valuable article on poisoning and its treatment. It will be found invaluable to the busy practitioner and is in just such a form that it may be carried about in the pocket and readily consulted.

MEMORANDA ON POISONS. By Thomas Hawkes Tanner. Eighth revised edition by Henry Leffmann. Philadelphia: P. Blakiston's Son & Co.

This little book will be of value not only to physicians, but also to pharmacists. It contains concise information regarding the diagnosis and treatment of poisoning and many other features connected with this subject. The handy compact form of the book will make it useful, particularly to students and young practitioners of medicine, as well as pharmacists who occasionally are called up to assist in the saving of life until the physician arrives.

// THE AMERICAN
JOURNAL OF PHARMACY

AUGUST, 1901.

ROTATION OF THE PLANE OF POLARIZATION BY MIXTURES.

BY W. PORTER BECK, Tutor in Physics.
The University of Maine.

The experiments described in this paper were suggested by Prof. James S. Stevens, and carried on by the writer during the past year. They had for their general object an investigation of the rotation of the plane of polarization by mixtures, as compared with that produced by the separate ingredients. A Laurent polaristrobometer was used, the special feature of which is a semi-circular plate of quartz which serves to retard half of the rays, so that under certain well-understood conditions there is an equal illumination of the field. The source of light used was a sodium flame produced by saturating the wick of a large alcohol lamp with common salt.

Assuming the truth of the law connecting the degree of rotation with the tube length, the first part of the experiment consisted in determining whether the apparatus available was sufficiently accurate for the proposed investigation. A triangular trough with one angle very small was made water-tight and covered on two sides with strips of paper perforated at equal distances. It was proposed by sighting through opposite apertures to measure the rotation due to a sugar solution, whose thickness increased as one passed from the apex to the base of the triangle. It was found, however, that the refractive effect of the glass sides, which could not, of course, he placed parallel to each other, prevented the field from being observed.

A more satisfactory method consisted in taking a piece of hard glass tubing, 2·51 cm. outside, and 2·15 cm. inside diameters, and cutting as great a length as could be used in the instrument, and cementing plates of glass over each end. *Fig. 1* shows the arrangement indicated. The cement used was melted asphalt, commonly known as "sidewalk pitch." It would be difficult to find a more perfect cement for glass than this substance; it is water proof,

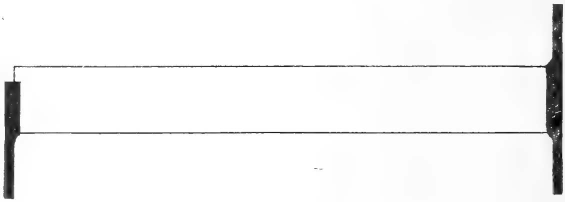

FIG. 1a.—Side view.

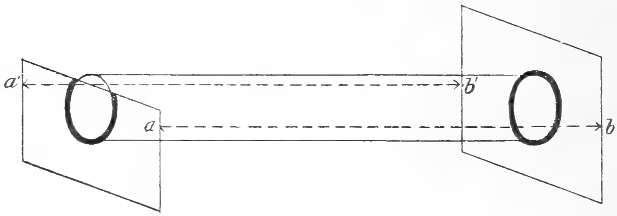

FIG. 1b.—General view of tube.

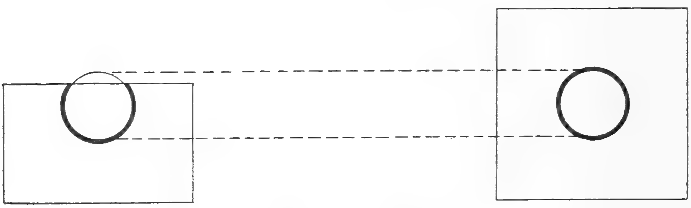

FIG. 1c.—Direct end views of tube.

and many of the common chemicals do not affect it. Another variety, known as "roofing pitch" is good, but more viscous, and not so well adapted for permanent strain.

A solution of glucose was placed in this tube and the end cemented on, leaving a small space as shown in the figure. Through this space the liquid could be introduced by means of a pipette, and when once filled the surface tension was sufficient to retain it.

The amount of rotation was next observed, and the tube unsealed at one end and cut down about 1 cm., refilled, and the process repeated. Observations for twelve lengths of tube were taken, and when plotted with the corresponding rotations, gave a fairly straight line, but the results were not considered sufficiently accurate.

In order to obtain the best possible results, a series of tubes, sixteen in number, was constructed, differing from each other by irregular intervals of length. These could be tested repeatedly and afforded a check on the work. To find their lengths, measurements were taken on two sides and the mean taken. The following table will show the method of procedure:

TABLE I.—LENGTH OF TUBES.

No. of Tube.	Length of *a b*.	Length of *a' b'*.	Mean (weight 1).	Length of *a b*.	Length of *a' b'*.	Mean (weight 2).	Final Average.
	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.
1	0·44	0·41	0·425	0·43	0·41	0·420	0·42
2	0·76	0·85	0·805	0·86	0·76	0·810	0·81
3	1·04	1·00	1·020	1·01	1·04	1·025	1·02
4	1·47	1·34	1·405	1·45	1·32	1·385	1·39
5	1·78	1·90	1·840	1·90	1·77	1·835	1·84
6	3·42	3·48	3·450	3·41	3·48	3·445	3·45
7	5·11	5·20	5·155	5·20	5·10	5·155	5·15
8	6·43	6·51	6·470	6·51	6·42	6.465	6·47
9	8·16	8·13	8·145	8·16	8·11	8·135	8·14
10	9·84	9·72	9·780	9·72	9·80	9·760	9·77
11	11·54	11·57	11·555	11·57	11·52	11·545	11·55
12	13·27	13·30	13·285	13·30	13·27	13·285	13·29
13	15·05	15·15	15·085	15·13	15·08	15·105	15·10
14	16·89	16·85	16·870	16·82	16·88	16·850	16·86
15	18·38	18·41	18·395	18·41	18·38	18·395	18·40
16	19·63	19·75	19·690	19·75	19·61	19·680	19·68

The next table shows the amount of rotation afforded by a solution of glucose in each tube. The table is printed in full in order to show the degree of precision obtained in making the readings.

TABLE II.

No. of Tube.	Readings.										Mean.	Corrected for Zero Error.
1	0·9°	0·8°	0·8°	0·9°	0·8°	0·8°	0·8°	0·8°	0·8°	0·7°	0·81°	0·35°
2	1.0	1·1	1·0	1·0	0·9	1·1	1·0	1·0	1·0	1·1	1·03	0·57
3	1·4	1·2	1·1	1·3	1·1	1·4	1·3	1·2	1·1	1·1	1·22	0·76
4	1·6	1·6	1·5	1·3	1·4	1·4	1·5	1·5	1·2	1·4	1·44	0·98
5	1·9	1·8	1.5	1·8	1·7	1·7	1·6	1·6	1·9	1·6	1·72	1·26
6	2·8	2·6	2·8	2·8	2·6	2·6	2·7	2·9	2·7	2·8	2·73	2·27
7	3·9	3·8	4·0	4·0	3·8	4·0	4·1	4·0	4·0	3·8	3·94	3·48
8	4·7	4·7	4·7	4·7	4·7	4·8	4·6	4·9	4·8	4·7	4·75	4·29
9	5·7	5·9	5·8	6·0	5·8	5·8	5·8	5·8	5·7	5·7	5·80	5·34
10	7·0	7·0	6·9	7·0	7·1	6·9	6·9	7·0	7·1	6·9	6·98	6·52
11	8·0	7·9	8·0	8·0	8·3	8·0	8·0	8·2	8·1	8·2	8·07	7·61
12	9·4	9·3	9·2	9·5	9·3	9·2	9·3	9·2	9·6	9·4	9·34	8·88
13	10·5	10·5	10·4	10·7	10·5	10·6	10·5	10·5	10·6	10·5	10·53	10·07
14	11·6	11·7	11·7	11·6	11·7	11·7	11·7	11·7	11·6	11·5	11·65	11·19
15	12·6	12·6	12·5	12·6	12·8	12·6	12·6	12·7	12·4	12·6	12·60	12·14
16	13·5	13·5	13·4	13·4	13·7	13·7	13·7	13·3	13·4	13·4	13·50	13·04

The curve which was obtained by plotting the tube-lengths and rotations as coördinates is shown below. It is so close an approximation to a straight line that the accuracy of the methods employed in the subsequent work may be regarded as established. (See *Fig. 3.*)

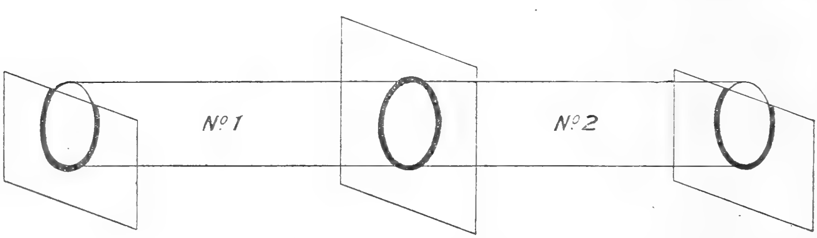

FIG. 2.—The double tube.

The next part of the work consisted in determining whether two rotating liquids in tubes placed end to end will produce an effect equal to the sum of the rotations of each liquid separately. For the sugar solutions a double tube was constructed as represented in the figure. (See *Fig. 2.*)

The two parts of the tube are referred to as No. 1 and No. 2. Their lengths were made as nearly equal as possible, but a cane sugar test showed that No. 1 rotated the plane 17°·83 and No. 2

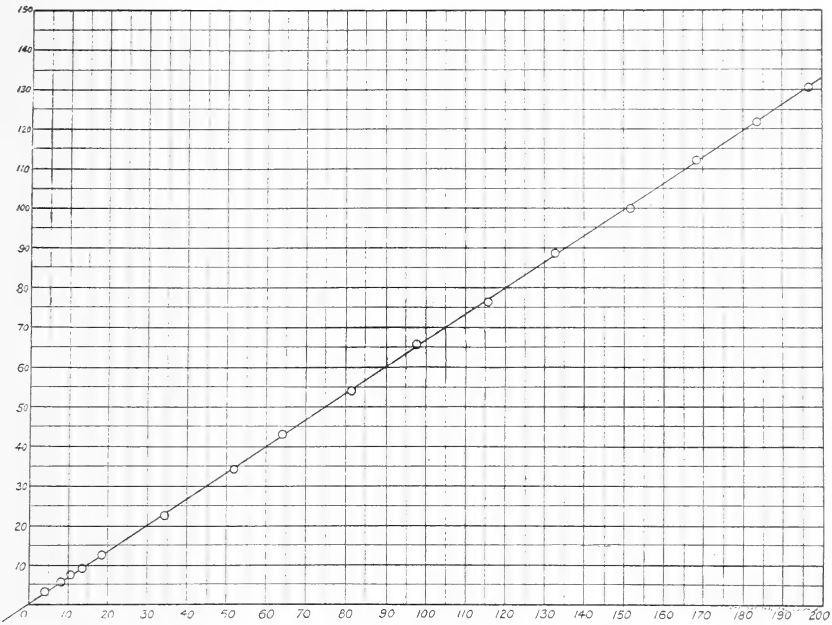

FIG. 3.—Length of tube. Optical rotation.

17°·79. Their ratios were, therefore, 1 : 1·002. The following table gives some of the results of this work:

TABLE III.

Liquid.	Rotation Observed.	Rotation Calculated.	Per Cent. of Deviation.
Granulated sugar sol. tube No. 1.	10°·54		
Grape sugar sol. tube No. 1.	7° 99		
Cane sugar sol. tube No. 2.	17°·79		
Cane sugar sol. tube No. 1.	17°·83		
Grape sugar No. 1. } Cane sugar No. 2. }	25°·83	25°·78	0 2
Granulated sugar No. 1. } Cane sugar No. 2. }	28°·44	28° 40	0·1

In making the test for oils it was found that enough of the pitch was dissolved to render the liquid somewhat opaque. Ordinary

bottles covered with perforated paper answered the purpose very well, and in the results which follow, the short tube belonging to the saccharimeter was used with a bottle containing the second liquid. The next tube shows the result of comparing the separate and combined effects of various oils.

TABLE IV.

Number and Name of Substance.	Rotation Observed.	Rotation Computed.	Per Cent. of Deviation.
No. 1, turpentine.	$-6°·30$		
No. 2, mixture of turpentine and orange.	$64°·42$		
No. 3, orange oil.	$24°·94$		
No. 4, mixture of nutmeg, orange and mint.	$17°·60$		
No. 5, orange oil (small bottle).	$13°·55$		
No. 6, mixture of nutmeg, orange and mint (small bottle).	$9°·43$		
Nos. 1 and 3.	$18°·72$	$18°·64$	0·3
Nos. 1 and 5.	$7°·16$	$7°·25$	0·4
Nos. 2 and 4.	$81°·97$	$82°·02$	0·1
Nos. 2 and 6.	$73°·39$	$73°·85$	0·6

In order to determine whether two substances mixed together would give the sum of the rotations due to the ingredients separately, solutions of the various sugars were placed in the double tube, and results reached as follow:

TABLE V.

Substance.	Rotation Observed.	Rotation Calculated.	Per Cent. of Deviation.
Tube 1, grape sugar.	$7°·99$		
Tube 2, cane sugar.	$17°·79$		
Mixture.	$12°·85$	$12°·89$	0·3

The calculated rotation was obtained by remembering that the relative lengths of the parts of the double tube were 1 : 1·002.

$$\frac{1·002}{2·002} \times 7°·99 = 4°·007$$

$$\frac{1·000}{2·002} \times 17°·79 = 8°.886$$

$$4°·007 + 8°·886 = 12°·89$$

A similar method was employed with the oils, the results of which are shown below.

TABLE VI.

Substance.	Number.	Rotation Observed.	Rotation Calculated.	Per Cent. of Deviation.
Orange oil.	1	86°·91		
Nutmeg oil.	2	21°·58		
Mixture of 1 and 2.		53°·77	54°·24	0·9
Turpentine.	3	12°·34		
Mint.	4	−34°·75		
Mixture of 4 and 5.		−15°·82	−15°·71	0·3
Mixture of 1, 2, 4, 5.		19°·02	18°·97	0·3

The results of the experiments described in this paper indicate that in making saccharimetric determinations various substances contained in tubes placed end to end yield results which are equal to the sum of the results taken separately, and furthermore, substances physically mixed together preserve their optical rotating properties independently of each other. This last law would enable one to determine the proportions of a mixture, if the amount of one substance and the rotating properties of each were known.

Incidentally it was found that this method could be used in determining the length of a column of liquid with greater accuracy than is afforded by the common methods of measurement. This was illustrated in measuring the lengths of the components of the double tube.

The principal sources of error encountered consisted in errors of observation, which were fairly well eliminated by repeated trials, and temperature changes. The latter were undoubtedly of very little moment.

THE INTERNATIONAL PHARMACEUTICAL CONGRESSES.

BY FR. HOFFMANN.

(*Continued from page 325.*)

FOURTH CONGRESS IN ST. PETERSBURG, 1874.

Early in 1874 the committee appointed by the Congress in Vienna addressed a circular letter of invitation and a programme for the fourth International Congress, to be held in St. Petersburg in August, 1874. The invitation was extended to all recognized

pharmaceutical associations and to pharmacists in general, each association being entitled to send one delegate for every one hundred of its members.

The Congress assembled August 12th to 17th. Twelve societies were represented by seventeen delegates from Russia, Austria-Hungary, England, France and Denmark. No delegates were present from Germany and the United States; the English delegation consisted of Mr. Thom. *Greenish* and Francis *Sutton*. Mr. Anton *von Waldheim*, of Austria, was elected President and Messrs. *Madsen*, of Denmark, and *Trapp*, of Russia, Vice-Presidents. The German language was chosen for conducting the deliberations, whilst the use of English and French was also permitted.

Three main questions were proposed for consideration.

(1) How far are assistants personally responsible in the exercise of their professional duties?—Upon this query the resolution passed that the proprietor was responsible for the good quality of all drugs, chemicals and galenicals, and for the proper management and conduct of the business, whilst the properly qualified assistant should be responsible for any mistakes committed by him or his fault and, during the absence of the proprietor, also for mistakes committed by apprentices.

(2) How should the Committee of Inspection of Pharmacies most suitably be composed and appointed?—This query, applying only to the usages in continental Europe, was answered by declaring that the periodical governmental inspection of pharmacies should be conducted by one medical practitioner and one practical pharmacist.

(3) Is it necessary that the professorships of pharmacy should be occupied by pharmacists?—In response to this query the resolution passed, that it is desirable that the professorship of pharmacy should be held by pharmacists and that there should be in the pharmaceutical curriculum two chairs, one for pharmacognosy and one for pharmaceutical chemistry.

(4) Has not the time arrived for the preparation and introduction of an international pharmacopœia?—This question had been answered in the Congress of 1867 by the American delegates in the negative. It again elicited a comprehensive deliberation. In general the necessity of uniformity in all pharmacopœial preparation was recognized. The Society of Pharmacy of Paris presented a

memoir and a draft of an international pharmacopœia. Such a one should not exclude national pharmacopœias, but the former one should serve as a standard in their revision so as to attain in the course of time as much as possible to a uniformity of all or the most commonly used medical preparations, particularely the more potent ones, as also to a uniform nomenclature and the general adoption of metric units and the use of the Latin language for the pharmacopœias.

A committee was appointed for examining the French elaboration and eventually for drafting a new one. The report should subsequently be sent to the Pharmaceutical Society of St. Petersburg before or by December, 1875. This should have the revised draft printed and send copies to the pharmaceutical societies represented at the present congress for revision and approval in time before the next congress.

The following suggestions were recommended to this committee for consideration: The language of the international pharmacopœia should be the Latin, as determined at the preceding congresses at Paris and Vienna. Metric weights and measures should be used where absolute quantities are required; but in pharmaceutical preparations parts by weight or volume might be used. All temperatures should be stated in the centigrade scale, and specific gravities at 15° C. The nomenclature of chemicals should be as simple and definite as possible. The minimum of active principle of narcotic drugs permitted should be stated. Tinctures and other galenicals should be made on one principle with the greatest simplicity, avoiding unnecessary ingredients. In chemical preparations the maximum of impurities allowed should be stated.

At the close of the Congress the invitation from the American Pharmaceutical Association* for holding the fifth Congress in Philadelphia was read, but in no way acted upon. A subsequent preliminary invitation by the British delegates present to hold the meeting in London prevailed, subject, however, to a forthcoming official invitation by the Council of the Pharmaceutical Society of Great Britain.† It was furthermore resolved upon that the fifth

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*Page 324.

† This invitation was unanimously adopted and acted upon by the Council on October 7, 1874 (*Pharm. Jour. and Transactions*, 1875, p. 285).

Congress should convene in the course of the next five years, or at the furthest in 1879.

FIFTH CONGRESS IN LONDON, 1881.

The convocation of the fifth Congress was for various reasons delayed beyond the time appointed in St. Petersburg in 1874. It was not before the end of the year 1880 that the Pharmaceutical Society of Great Britain issued a circular letter of invitation to the pharmaceutical societies as well as to prominent pharmacists, with the request to send delegates and to attend the meetings of the congress to be held in London in August, 1881. As main objects for deliberation there were mentioned the international pharmacopœia, pharmaceutical education, and the relations of pharmacists to the medical profession and the public.

Forty-eight delegates, representing pharmaceutical societies of England, France, Germany, Austria, Russia, Italy, Belgium, Holland, Denmark, Sweden and Australasia, attended the Congress and quite a number of visitors from Great Britain and abroad, among them two from the United States of America (Fr. *Hoffmann* and Oscar *Oldberg*). Dr. Theophilus *Redwood*, of London, was elected President, and not less than sixteen honorary vice-presidents and five honorary secretaries were proposed and elected.

The subject of an International Pharmacopœia was introduced by papers read by Messrs. *J. Dittrich*, of Prague, *J. Martenson*, of St. Petersburg, and *Madsen*, of Copenhagen, each one presenting a number of suggestions and approving the principles recommended by the Congress at St. Petersburg.

In regard to the draft elaborated by the Pharmaceutical Society of Paris and offered to and accepted by the Congress at St. Petersburg, an unavailing controversy as to the final disposition of the manuscript occurred. It was stated that it had been burned in St. Petersburg by an unfortunate mistake or accident, while the French delegates claimed that the original draft was in their possession. The fact is that no available action whatever seems to have been taken with this initial draft for the elaboration of an International Pharmacopœia.

The lengthy discussions about a universal code resulted in the following resolutions unanimously adopted:

(1) The fifth International Pharmaceutical Congress held in London, August, 1881, confirms the resolutions at the previous congresses, as to the utility of an universal pharmacopœia, but is of the opinion that it is necessary at once to appoint a commission, consisting of two delegates from each of the countries represented at this Congress, which shall prepare within the shortest possible time a compilation in which the strength of all potent drugs and their preparations is equalized.

(2) The Executive Committee of this Congress is requested to take the necessary steps that the resolution be speedily carried out.

(3) The work, when ready, shall be handed over by the delegates to their respective governments or their pharmacopœial committees.

(4) It is desirable that the commission establish a uniform systematic Latin nomenclature for the pharmacopœias of all countries.

(5) It is desirable that the commission take measures that an official Latin translation be made of the pharmacopœias of different countries which are not now published in that language.

(6) It is desirable that the commission be put in possession of all the manuscripts, including the documents relating to the Universal Pharmacopœia, compiled by the Society of Pharmacy of Paris and presented at the fourth meeting of the Congress at St. Petersburg.

(7) That the pharmaceutical societies of the respective countries be requested to nominate those members of the commission not appointed by this Congress, and to fill up any vacancies which may arise from time to time.

The next subject of discussion referred to the equalization of the strength of official pharmaceutical preparations containing potent drugs. Mr. *Madsen*, of Copenhagen, presented, in a comprehensive address, a record of previous efforts for attaining to a satisfactory union in this matter, and papers about the subject were read by Messrs. *Peter Squire*, of London, Professor *Schaer*, of Zürich, Dr. *Brunnengraeber*, of Rostock, Professor *Maisch*, of Philadelphia, and others.

The preceding resolutions in regard to the International Pharmacopœia embody the conclusions reached by these writers and the discussions.

The question of pharmacopœial revision was introduced by Mr. *Carteighe*, of London, giving a concise sketch of the condition of pharmacy in England before the foundation and the educational exertions of the Pharmaceutical Society in 1841, as well as of the origination of the British Pharmocopœia in 1864 by the fusion of the pharmacopœias of London, Edinburgh and Dublin, until then in use. The modus of revision prevailing in the various countries was commented upon by Mr. *Peter Squire* and Dr. *Theoph. Redwood*, of England, Dr. *C. Schacht*, of Germany, Dr. *Poehl*, of Russia,

Mr. *von Waldheim*, of Austria, Mr. *Sinimberghi*, of Italy, Dr. *de Vrij*, of Holland, Mr. *Lotze*, of Denmark, Dr. *Gille*, of Belgium, and Professor *Oldberg*, of the United States of America.

The opinions and propositions as to the interval between the successive revisions of the national pharmacopœias were somewhat divergent, five years being considered the minimum and ten years the maximum. The opinion prevailed that a Standing Pharmacopœial Committee was preferable to a temporary one at the time of each revision, and that such committee should consist of a majority of pharmacists.

A discussion on pharmacopœial nomenclature also took place. This question, as well as that of revision, was duly taken in consideration in the final resolutions passed in regard to an international pharmacopœia, stated on page 377.

The question of pharmaceutical education being a permanent feature of pharmaceutical congresses, was again discussed at great length, each speaker reflecting the methods and views prevailing in his country. The general opinion shared by all seemed, however, to be that higher requirements as to preliminary and to professional education, both in apprenticeship and university or college instruction, are requisite, and that the curriculum of the branches of instruction should be enlarged in compliance with the recent extensions in the domains of chemical, pharmacognostical and microscopic knowledge and application. An approximate uniformity in the methods and the scope of professional education was also recommended as desirable.

A motion by Mr. *Petit*, of Paris, "that it is desirable in all countries that the curriculum of professional education of the pharmacist should be made uniform with that of the grade of doctor of medicine," was laid upon the table, and, in conclusion, the whole question was left an open one to be considered by subsequent congresses.

The last question discussed was on the relations of pharmacists to the medical profession and the public. This intricate subject of long standing evidently met with little interest, as its bearing is a very different one in the various countries, and no special action was taken.

In conclusion, the place for holding the next Congress was taken into consideration. Only one invitation had been received, namely,

from the *American Pharmaceutical Association*. The officers of the Congress, however, had come to the conclusion that a more accessible country would be preferable, and the city of Brussels was selected for holding the next Congress in 1884.

SIXTH CONGRESS IN BRUSSELS, 1885.

The sixth International Pharmaceutical Congress should have been called to Brussels in 1884, but on account of a general industrial exposition taking place in Antwerp in 1885, it was postponed to this year. The local committee at Brussels had succeeded in securing the interest of the highest authorities of the State in the Congress, so that it was for the first time in the history of pharmaceutical congresses favored with royal patronage, and by the participation of high State officers. This fact was a novel one, as well as the latitude in the programme issued with letters of invitation by the local committee early in 1885. This proposed, among other things, the consideration of the following questions: On theoretical and applied pharmacy; on hygiene and public health; on biological and legal chemistry; on the international pharmacopœia elaborated and to be presented by the commission appointed at the Congress in London, in 1881; on pharmaceutical education; on sophistication of alimentary substances, and, finally, on potable waters, their requisite quality, and the best methods for their examination.

Other innovations of this Congress were that it invited delegates from governments, universities, schools of pharmacy and from pharmaceutical, chemical and hygienic associations, and all those interested in the subjects pertaining to pharmacy in its broadest scope, who desire to attend the meeting and pay a fee of 10 francs ($2) for admittance. Another novel feature was that all questions brought for discussion before the Congress should first be considered and reported by sections.

The Congress convened at its first meeting in Brussels, August 31, 1885. It was opened, on behalf of the King of Belgium, by his representative, the Minister of Foreign Affairs, Prince *Caraman-Chimay*. It was of all the preceding pharmaceutical congresses the most frequented one, consisting of approximately 300 delegates and visitors, representing twenty-three countries and seventy-two societies, whilst at the meetings in Vienna only eight countries, at

St. Petersburg five countries, and at London eighteen countries were represented. The United States were, as in London, not represented by a delegate, while Mr. *Fred. Stearns, Sr.*, of Detroit, attended as a visitor.

Mr. *Van Bastelaer*, of Brussels, was elected President, and quite a number of honorary vice-presidents and sectional presidents. As much as this Congress differed from the preceding ones in its organization, sections and the admittance to membership, it deviated also in the nature and variety of questions proposed and introduced in its deliberations. Besides the inveterate questions of an international pharmacopœia, equalization of the strength of pharmacopœial preparations, pharmaceutical education and examination, the relation of pharmacists to physicians, and nostrums and specialties, such questions as veterinary pharmacy, the regulation of the supply of patent medicines, the repetition of prescriptions containing poisonous alkaloids, the sale of morphia and opiates, the relative advantage of self-made chemicals and galenicals over purchased ones, the danger of lead pipes for water supply, of poisonous pigments, of the adulteration of food, the freedom of movement of assistants, etc., were introduced and more or less discussed, and resolutions passed thereon. Of these only those questions may be briefly mentioned here, which strictly apply to the practice of pharmacy.

The question of pharmaceutical education was, as at the previous congresses, fully ventilated with the same variety of diverging opinions, according to the usages and the conditions prevailing in each country. The delegates from Belgium submitted the following propositions:

(1) That in all countries where it is not already the case, a diploma should be established, giving the exclusive privilege to practise pharmacy.

(2) To require candidates for pharmaceutical qualifications to pass through the same preparatory course of study as medical men and doctors of science.

(3) That the minimum of knowledge to be required of the pharmacist should be defined.

(4) The various titles now in use should be replaced by that of "doctor of pharmacy."

(5) To obtain as a subsidiary object, limitation of the number of pharmacies proportional to the population.

These motions were controverted, particularly by German, Austian and Russian delegates, as also the proposition to continue, as in France, or introduce two grades of pharmacists, one for those

who serve the practical and mercantile side of pharmacy, and one for those who aim higher and desire to devote themselves to the scientific objects and aims of the modern application of pharmaceutical knowledge and practice. Other delegates argued that it would not do to aim too high in the extent of erudition and too far in the practical domain of the pharmacist, as also that the professional and social standing of the pharmacist could not be raised by mere titles and diplomas, but only by personal qualification and character. Academic degrees should not be degraded for the sake of professional vanity and convenience. It would be better and proper, as Messrs. *von Waldheim* and *Genevoix* stated, to be conservative and not to enter upon extravagant experiments in regard to the consonant position and requisite attainments of the practising pharmacist. Professor *Cannizzaro* stated that in Italy the government had been compelled to recede from its too high requirements at the pharmaceutical examinations, because young men refrained from entering under such conditions a profession with so limited chances.

Mr. A. *von Waldheim*, President of the commission for the elaboration of a draft of an international pharmacopœia, appointed by the Congress in London in 1881, had performed this duty and submitted his elaboration to the Congress. The paper contained a historical introduction; 232 drugs and preparations had originally been proposed to be incorporated into the pharmacopœia; of these, 188 were approved by the commission, but further propositions from various countries carried this number up to nearly five hundred articles. Upon further consideration and voting, 293 articles were accepted and adopted in the draft; of these, 188 were considered as indispensable in a pharmacopœia, whilst 112 were of less consequence. In the draft the former ones were printed in larger, the latter ones in smaller type, and on the margin it was stated in what national pharmacopœias they are contained.

This draft and its principles met with so general appreciation and approval, that the French delegates retracted their draft presented to the Congress in St. Petersburg, in 1874.

It was resolved to have the draft of Mr. *Waldheim* distributed for consideration and further suggestions and to have it subsequently printed and published.

The question of the limitation of pharmacies in proper proportion to the number of inhabitants, was discussed by the delegates of the

continental countries. Mr. *Bratimos*, of Athens, advocated strict limitation; his views were supported by others; Professor *Godefroy*, of Vienna, described the legal regulations in Austria, Mr. *Krohn*, those of Norway, and Mr. *Bernaco*, those of Italy. Delegates from Holland thought it sufficient to exact limitation only by stricter requirements in the professional qualification of the pharmacist.

The resolution was finally passed that the Congress approve of the principle that the public interest of every country requires a limitation in the number of pharmacies, and that this Congress elect a committee to report to the next Congress on the condition of the pharmacists in the various countries and to collect statistical and other evidence of the advantages derived from the limitation of the number of pharmacies.

A voluble and acrimonious discussion was brought about by the question of nostrums and specialties. Professor *Zanni*, of Constantinople, moved that this Congress appoint an international commission, charging it with the examination of the prevailing nostrums and specialties of the market and to discriminate between those which may be admitted and those which should be prohibited. Belgian and other delegates depreciated the nostrum trade, while a number of Parisian pharmacists pleaded in favor of specialties and proprietaries. They called attention to the great economic importance of this ever increasing industry, the export of such remedies from France alone amounting to, approximately, 14,000,000 of francs *per annum*. They also controverted the assumption that this industry was based indiscriminately upon barter and gain without any scientific and therapeutical principles and merits. Such remedies were justified and sanctioned by their undeniable success and popular confidence and approval and were largely of recognized value and advantage to both the poor and the wealthy.

Notwithstanding this warm endorsement, the following resolution was passed with a considerable majority: "The Sixth International Pharmaceutical Congress deems it desirable in the public interest that nostrums and pharmaceutical proprietaries be strictly prohibited in all countries."

Attention was called by Mr. *Limousin*, of Paris, to the fact that twenty years ago a similar resolution had been passed by the Congress at Brunswick without any appreciable success or effect. The

industry of specialties had wonderfully progressed and prospered ever since.

The question of the dispensation of potent and poisonous substances in prescriptions and the indiscriminate repetition of these was fully taken in consideration, as well as the sale of morphia and opiates, and it was agreed that a strict regulation is imperative, but is mainly in the function of medical and sanitary authorities and the special legislation of each country.

Papers were read and a lengthy discussion took place on the questions of adulteration of food and the quality and purity of potable waters, and comprehensive resolutions were passed for instituting national and international regulations for their control and examination as well as for adopting standards defining the requirements to be made upon water to be considered of normal and healthy condition.

The question of the freedom of movement (Freizügigkeit) of pharmaceutical assistants and some other questions of the lengthy programme, more or less irrelevant to pharmacy of non-European countries, were briefly discussed without any definite result, or altogether dropped.

At the final close of the meetings it was resolved that the seventh Congress shall be held at Milan in 1888.

(*To be continued.*)

THE STORY OF THE PAPAW.

By F. B. Kilmer.

(*Concluded from p. 348.*)

GLUCOSIDE OF THE PAPAW.

The *Carica Papaya* contains a glucosidal body, caricin. This I have never been able to obtain except from the seed, in which it is fairly abundant. From this source it may be extracted after boiling the seeds with 75 per cent. alcohol. The residue after alcoholic extraction is then exhausted with water. The aqueous extract after the addition of barium carbonate is evaporated to the consistency of a soft extract from which the glucoside may be extracted with hot alcohol. From such a solution the glucoside separates upon concentration. This glucoside resembles sinigrin.

It is decomposed by the glucoside splitting ferment, myrosin (obtained from mustard), giving a volatile, odorous, pungent flavor suggestive of the Cruciferae, but not so marked.

The seeds of papaw also contain the glucoside splitting ferment, myrosin. The glucoside resides within the hard inner coating of the seed, while the myrosin ferment is secreted in the gelatinous outer envelope. Myrosin may be extracted from this mucilaginous substance with water and precipitated from the watery solution by alcohol.

By pursuing the methods here briefly outlined, we may separate the glucoside from the inner section of the seed and the ferment from the outer coating; and by bringing the two substances together in the presence of water, the glucoside will be decomposed with the production of a volatile essence and glucose.[18]

The myrosin ferment extracted from the mucilaginous coating of the papaw seed will decompose sinigrin. The action of this ferment and decomposition of the glucoside is apparent to the sense of taste when the seeds are chewed. The taste and odor indicate that the glucoside and ferment are present in the bark of the root.

ALKALOID.

An alkaloid—carpaine—has been separated from the *Carica Papaya.* The source so far noted has been the leaves.

The usual method of extraction is to digest the leaves in alcohol acidulated with hydrochloric acid (5–100); evaporate the extract, wash with water acidulated with hydrochloric acid (2–100). This solution is then washed with ether; made alkaline with sodium hydrate and the alkaloid washed out in chloroform or ether. In my experiments the yield was small. I have noted indications of alkaloidal reaction with Mayer's reagent in the alkaline ether washings, from the latex, but it cannot be stated that the alkaloid is present in this product.

The alkaloid, carpaine, is soluble in absolute alcohol, amylic alcohol, chloroform, benzine and in water acidulated with hydrochloric acid.

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[18] It has been demonstrated that in many instances the ferment and the glucoside upon which the ferment acts are enclosed in different cells in plant tissue.

A solution of carpaine reacts with indicators as follows:—red litmus paper is turned blue; hæmatoxylin, deep rose or wine; rosolic acid, deep rose; cochineal, deep rose; methyl-orange, yellow; lacmoid, no change. Phenolphtalein causes a turbidity with the usual red, but the reaction is obscure in the presence of alcohol.

The physiological action of this alkaloid is quite similar to that of digitalis, a heart depressant.

Carica Papaya cultivated.

MARKET PREPARATIONS OF THE PAPAW.

There are numerous preparations in our own and in the European markets claiming to be the ferment of the papaw. These are sold under the name of "papain," "papayotin," "caroid," "papoid," etc.

From a somewhat extended examination I am quite satisfied that several of the preparations named are the dried and powdered papaw milk. In this case they bear the same relation to the true separated ferment as the dried mucous membrane of the stomach

might bear to purified pepsin. Some of these so-called papains retain the waxy, rubber-like constituents and the acrid, irritating resins of the milk.

The application to such crude material of the term "papain," or any similar name which would imply the isolated ferment, is misleading and should be abandoned. The dried juice of the papaw, or a mixture of the dried juice with any other ferments, should be properly labelled. From these crude preparations, the true ferment can be separated by extraction with water and precipitation with alcohol. In a few experiments which I have tried, some of the crude preparations were found to contain about twenty per cent. of the ferment-bearing bodies (albuminous).

There are, however, preparations in the market which consist of the more or less purified and separated ferment, or, more accurately speaking, consisting of the separated proteids; with which the ferments are associated.

I know of no standard by which these market preparations can be judged. They vary greatly in their proteolytic action. In such as may be prepared by simple drying of the milk, no two lots can be alike. These will be found to vary in color, to emit an offensive odor and to have a marked acrid disagreeable taste, producing, in several instances in my experience, quite a sharp caustic action.

The dried papaw juice is usually the more energetic in the beginning of digestive action than is the purified ferment, but this energetic action of the dried juice apparently soon ceases, while the pure ferment, though slower in immediate action, continues its activity for many hours. Upon treating the preparations made of the dried juice with ether, chloroform, benzine or alcohol, evaporating the solvent, the waxy resinous and rubber-like residue elsewhere spoken of will remain.

The amount of residue left after extraction with water may be taken as a rough estimate of the foreign material present, the ferment itself being associated with a more or less soluble albumose. A more accurate method of estimation as to the amount of ferment-bearing bodies is as follows:—Extract a weighed portion of the powder with water (two or three successive portions with trituration); combine the aqueous solutions and saturate with crystals of magnesium sulphate and sodium sulphate in about equal proportions. If the solution is warmed the precipitate will be quicker.

The precipitate thus obtained, freed from salts by dialysis, will consist of albumose and globulin, and the weight of these when dried will give the measure of soluble bodies with which the ferment is associated, or the amount of ferment-bearing bodies in the sample.

In the best of the market preparations which I have examined I have found, in addition to these soluble bodies, insoluble globulins and an appreciable amount of peptone, the latter not being precipitated by the foregoing methods.

Carica Papaya, split open to show sections in centre of trunk.

DIGESTIVE ACTION.

The digestive action of the ferment of the papaw plant has been quite fully described. The actions which are here summarized have been made with one of the market ferments sold under the name of "Papoid."[19]

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[19] This preparation was used on account of its convenience and because of the lack of sufficient material, separated by the processes outlined in another part of this paper.

Papoid is a German production, and, according to the statement of the manufacturers, it is prepared by precipitation from a watery extract of the papaw juice or milk. It consists essentially of globulin and albumose, associated with the ferments, and in addition it contains a small amount of natural inorganic salts. This preparation was used by the writer in a previous communication, and by Chittenden, (See "Papoid Digestion" Transactions of Connecticut Academy, Vol. IX, 1892.)

The action of this ferment presents features which contrast peculiarly with those of the ordinary digestive ferments. Direct comparison of the enzyme of the papaw with any other ferment is practically impossible, and this is especially true as to its behavior in comparison with the animal ferments.

The action of most ferments is inhibited by the products of digestive action; such does not seem to be the effect in the case of the papaw enzyme. It acts in a concentrated solution, even when carrying products of its own action. Certain of my experiments tend to show, however, that this enzyme has a notable action in a stream of running water. In other words, its action seems to be continuous, and the ferment is not removed by washing or by the action of fluids in which it is soluble. One such experiment was as follows:

Two ounces of raw lean beef were cut into slices, over which was poured an alkaline solution of the papaw ferments. The beef was allowed to remain in this solution for half an hour, during which time the solution was fairly well absorbed and the beef somewhat softened. The whole was then wrapped in a filter paper, transferred to a fine muslin bag; this bag and contents were placed under a faucet of running water and allowed to remain for five hours. Upon opening the bag it was found that only a few shreds of meat remained.

In order to demonstrate that the action was not that of a washing away process due to force of the water, a check experiment was made without the ferment, here the loss in weight only amounted to about fifty per cent.

This experiment seems to show that the enzyme combined with and hydrated the fibres of the meat. The products of this combination are soluble, and are removed by the action of water or other fluids; furthermore, in the process of washing away the soluble

products, the ferment is left behind to act upon a fresh portion of the fibre, in turn giving rise to soluble products or peptones.

This experiment was made in order to imita e certain known conditions present in the process of digestion, where there is a constant stream of fluid in the intestinal tract. Taken with other experiments this result seems to show that ferments of the papaw act very energetically in a small amount of fluid, and will also act in a stream of water.

Wild Papaw.

The influence of reaction upon the ferments of the papaw form an interesting comparion with those of the animal ferments.

The power of pepsin is destroyed in alkaline solution, such as lime water, sodium bicarbonate, ammonia, etc.; on the other hand the activity of pancreatin, ptyalin or diastase is inhibited in acid solution. The papaw enzyme is active in acid, neutral or alkaline solution; but pepsin and pancreatin cannot be mixed together in solution either acid, alkaline or neutral, and still preserve their

characteristics; whereas, the ferments of the papaw can be mixed with other ferments in a solution of any reaction. Pepsin is inert in a neutral solution, and is destroyed in solutions containing traces of alkalinity. If an alkaline solution of pepsin be made acid, the pepsin action is not restored; pancreatin acts slowly in neutral solutions, and is destroyed in acid solution. If an acid solution of pancreatin be made alkaline, the pancreatin action will not be restored. The papaw ferments are active in neutral solutions; their activity is enhanced when such solution is made acid, and if such acid solution be in turn made alkaline, the ferment will still remain active. In fact, the changing of solution of the papaw ferments from acid to neutral, then to alkaline; then reversing the order to neutral, acid and alkaline, or, in fact, changing the order of reaction almost indefinitely, does not thereby destroy the ferment which seems to remain active under all reactions and conditions.

Certain physical changes in the proteid substances acted upon are characteristic of these enzymes of the papaw. For instance: when raw blood fibrin or raw beef is acted upon with an alkaline solution of these ferments, there is an immediate softening to a jelly-like mass in which the fibres lose their individuality, this jelly gradually becoming thinner under the further action of the ferment.[20]

In the case of cooked beef in either alkaline or acid solution, the action of the ferment of the papaw is quite different. There is a rapid disintegration of the fibres which separate into tiny fragments. Finally the undigested portion becomes a pultaceous residue.[21]

A most interesting feature of the papaw enzyme is its action at a wide range of temperature. With the animal ferments, especially pepsin and trypsin, digestion is very slow at room temperature, 68 to 70 F. While at this temperature the papaw enzyme acts as energetically as at 110 F., the animal ferments act most energetically at body temperature (diastase at 130 F.)

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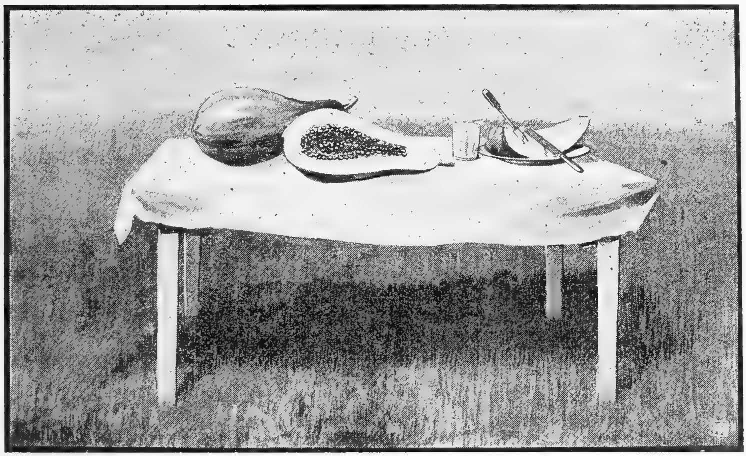
[20] This action in the case of blood fibrin is quite striking, and advantage is taken of this property in therapeutics where a solution of the ferments is used as a solvent for the false membrane of diphtheria, a substance quite analogous to blood fibrin.

[21] It is notable that with meat proteids, both cooked and uncooked, in acid or alkaline solutions containing no ferment, there is a marked swelling of the fibre. In an alkaline solution this becomes a solid jelly, but this swelling seems to be entirely counteracted by the presence of the papaw ferment.

With the animal ferments, if the temperature be raised to near 140 F., there is a diminution in the digestive action, and at about 158 F., pancreatin is destroyed; pepsin at about 160 F. Quite the reverse is the influence upon the papaw ferments. Here the action, beginning as low as 50 or 60 F., increases slightly with the rise of temperature until between 155–160 F. it reaches the maximum. The action is not entirely destroyed even at a few moments' exposure at the boiling point. A digestive ferment active at temperatures ranging from 50 F. to the boiling point is notable.



Papaw fruit as a tropical dessert.

PRODUCTS OF DIGESTION BY THE PAPAW FERMENT.

A peculiar phenomenon arises in the digestion of albumen by the papaw enzyme. It is particularly noticeable in the digestion of egg albumen in alkaline solution, but it is manifest in the digestion of raw flesh albumen in either acid, neutral or alkaline media. After every prolonged digestion there is found an undissolved residue, which many observers have characterized as an unchanged albumen, and which is usually measured as undigested residue. But such is not the case. This residue is an altered albumen; is soluble in 0·3 to 0·5 per cent. solution of sodium carbonate or 0·2 per cent. hydrochloric acid. From such solution it is reprecipitated upon neutralization, and re-dissolved by an excess of the precipitant. It is insoluble in salt solutions. Its solution in sodium carbonate upon dialysis becomes almost entirely soluble in water.

The dialyzed solution noted above gives a precipitate with acetic acid and potassium ferrocyanide, but nitric acid gives no precipitate. The solution gives the ordinary proteid reactions, and apparently the whole of the proteids are reprecipitated by the addition of a large quantity of alcohol. This body is further digested after washing and treatment with a fresh solution of the ferment, and also in an acid solution of pepsin; it is almost completely digested in an alkaline solution of trypsin, yielding (as shown at one trial) the ordinary

Method of collecting Papaw latex.

products of digestion. This body corresponds quite closely to the antialbumid found in digestions by hydrochloric acid and by trypsin.[22]

The products arising in the digestion of egg albumen, blood fibrin or beef albumen are quite alike either in acid, alkaline or neu-

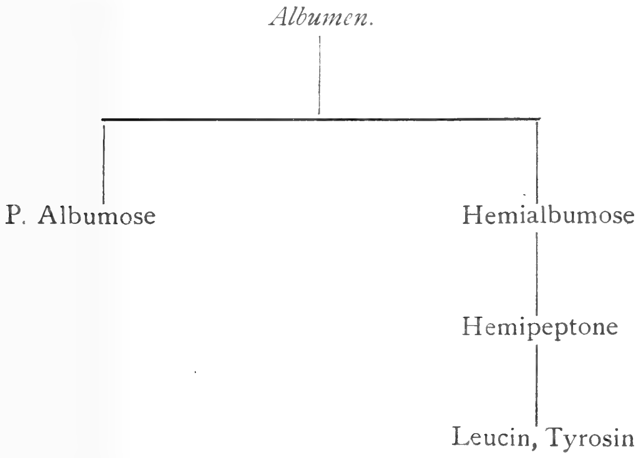
[22] A quite similar body is found in Brometin digestion of albumen. (See Chittenden—*Journal of Physiology*, No. 4, 1893.) It is quite evident that this body would be readily converted into soluble absorbable products in the digestive tract.

tral solutions, with the exception of certain slight modifications dependent upon the conditions of trial, reaction, etc. Hemialbumose (protoalbumose, deuteroalbumose and, in some instances, heteroalbumose), hemipeptone, peptone products, and the amid bodies, leucin and tyrosin, are all found in addition to the peculiar body above noted which is present only in minute amounts.

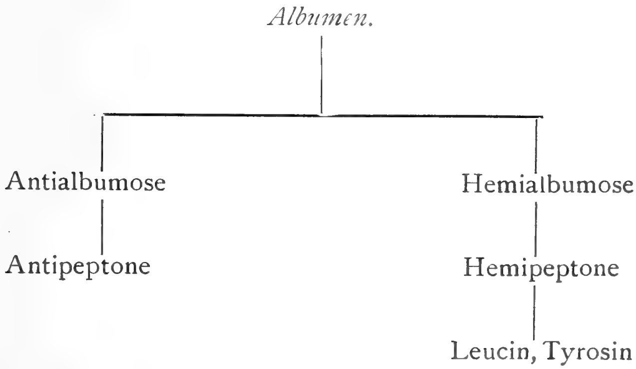
All of these bodies seemingly make their appearance in the early stages of digestion, and each one is found at the end of prolonged digestion, although under ordinary circumstances deuteroalbumose and true peptone predominate to a high degree.

The close identity of the products of the action of the enzyme of the papaw and that of tryptic and pepsin digestion can be seen in the accompanying diagram:

PAPAW FERMENT DIGESTION.



TRYPSIN DIGESTION.



PEPSIN DIGESTION.

Albumen.

Antialbumose	Hemialbumose
Antipeptone	Hemipeptone

NITROGEN IN DIGESTIVE PRODUCTS.

It is well known that the hemialbumoses and peptones formed by pepsin or trypsin show an increase of nitrogen above that of the original proteids. In the case of the ferments under consideration this is reversed; the proteid products show a decrease in the nitrogen content. The following experiment illustrates this: The clear filtrate resulting from a prolonged digestion of egg albumin in a neutral solution, was concentrated, filtered and precipitated with alcohol, extracted with hot alcohol; the resultant mass (consisting for the most part of peptones) was then subjected to analysis by the Kjeldahl process. The average result of three trials expressed in percentage was N, 14·14.

The following comparison with the nitrogen content of proteids will illustrate the point:—

Egg albumen	N. 16.02	Hamerstein . . . . .
Hemialbumose	N. 16.55	. . . . Kuhne
Soluble proteoses (papaw ferments)	N. 14.14	(3 trials) . . . . . Kilmer

The action of the papaw ferments upon milk is quite identical to the action of pancreatin. There is first the act of curdling in which the casein is separated into a soft flocculent precipitate; this is followed by a digestion of the proteids, during which process they are converted into soluble and diffusible products. The curdling takes place at ordinary temperature in neutral or alkaline reaction; is delayed by increase of alkalinity, and hastened by increase of temperature. The digestive action proceeds independent of the act of curdling, and whether the reaction is neutral, acid or alkaline. (Best digestion is with 2 per cent. bicarbonate of soda or 25 per cent. lime water.)

In addition to the proteolytic and rennet ferments noted, and the probable presence of pectase, there is present in the papaw latex, amylolytic ferment capable of acting upon cooked starch. The amount of this starch-converting ferment is not large, or else it is weak. The fresh latex acts promptly upon starch paste, thinning it, and converting a portion at least into soluble starch and dextrin. (The amount of reducing sugar produced is slight.)

The starch-converting action of the separated ferment (or dried latex) is not very pronounced. The most that can be said is that it is present.[23]

Altogether we are warranted in the statement, that the digestive action of the ferments contained in the papaw latex and the products formed in such are quite identical with that of the animal and vegetable ferments in general.

A RAPID METHOD FOR DETERMINING THE VALUE OF "CHROMIC ACID" AND THE SOLUBLE CHROMATES.

By Lyman F. Kebler, B.S.

The principle involved in the beautiful and exact method for estimating iodine by means of sodium thiosulphate was brought forward by A. du Pasquier,[1] but the original method gave neither satisfactory nor concordant results. Bunsen[2] took up the process and pointed out the cause of its shortcomings. These researches on the volumetric estimation of iodine, in connection with Schwarz's[3] proposed use of sodium thiosulphate instead of sulphurous acid, produced a very beneficial effect on the whole domain of chemical analysis. The value of the process is not so much in the estimation of iodine in iodine compounds, but rather in the determination of such substances as will liberate iodine when brought in contact with potassium iodide, either by direct displacement (*e. g.*, the chlorinated compounds, chlorine water, bromine, etc.) or by reduction in the presence of hydrochloric acid, either with or without

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[23] The pronounced amylolytic action of some of the papaw ferments in the market is probably due to the addition of diastase.

[1] 1840, *Anal. de Chimie et de Physique*, **73**, 310; *Silliman's Jour.*, **40**, 123.

[2] 1853, (Liebig) *Anal.*, **86**, 265–291.

[3] 1853, *Anleit. zu Maassanal. Nachträge*, 22.

heat (*e. g.*, CrO_3, PbO_2, MnO_2, As_2O_5, $FeCl_3$, etc.). The details of the various methods must be worked out for each substance to be estimated. If a chromate is boiled with an excess of strong hydrochloric acid, chlorine is liberated, which can be distilled and conducted into a solution of potassium iodide, contained in a suitable apparatus. The distillation may be avoided by mixing the chromate, a saturated solution of potassium iodide and the hydrochloric acid in a strong bottle, provided with an accurately ground stopple. The stopple is firmly tied in, the bottle with its contents immersed in water and the temperature raised to boiling, where it is kept for one hour. The bottle is then removed, cooled and the amount of liberated iodine estimated by means of N/10 sodium thiosulphate.

Both of the above methods are more or less tedious and are liable to give abnormally high results, on account of the proneness of the hydriodic acid formed to decompose. A blank should always be carried.

The writer has used the following method with considerable satisfaction: Dissolve about 1 gramme (accurately weighed) in enough distilled water to make exactly 100 c.c. Of this solution transfer 20 c.c. into a porcelain evaporating dish containing 75 c.c. of water, add 2 grammes of potassium iodide, 15 c.c. of 10 per cent. sulphuric acid and mix well. Then add, from a burette, N/10 sodium thiosulphate until a distinct blue color, without yellowish cast, results, or the end may be determined by means of a starch solution.

It was at first thought that some time must be allowed for complete reaction of the above mixture, before the liberated iodine can be estimated, but the writer soon found that the reactions were almost instantaneous.

The reactions involved are represented by the following equations:

(1) $2\,CrO_3 + 6\,KI + 6\,H_2SO_4 = 3\,I_2 + Cr_2(SO_4)_3 + 3\,K_2SO_4 + 6\,H_2O$.

(2) $3\,I_2\ 6\,Na_2S_2O_3 = 3\,Na_2S_4O_6 + 6\,NaI$.

(3) $K_2Cr_2O_7 + 6\,KI + 7\,H_2SO_4 = 3\,I_2 + 4\,K_2SO_4 + Cr_2(SO_4)_3 + 7\,H_2O$.

(4) $3\,I_2 + 6\,Na_2S_2O_3 = 3\,Na_2S_4O_6 + 6\,NaI$.

According to equations (1) and (2), one equivalent of CrO_3 requires three equivalents of $Na_2S_2O_3$, or the decinormal factor of CrO_3 is one-third of 0·009988 or 0·003329. In the same way the

decinormal factor of potassium bichromate is one-sixth of 0·029378 or 0·004896.

An examination of several samples of "chromic acid" gave the following results:

Number.	Color of Crystals.	Sulphates.	Per Cent. of CrO_3.	Aqueous Solution.
1	Brownish red	Much	66·66	Clear
2	Dark crimson	None	95·71	"
3	Light brick red	60·53 per cent. calculated as $NaHSO_4, H_2O$	38·28	"
4	" " "	59·76 per cent. calculated as $NaHSO_4, H_2O$	38·89	"
5	Crimson	4·2 per cent. calculated as H_2SO_4	93·83	"

There certainly is a marked difference in the physical appearance of the above samples. No. 2 was of satisfactory quality. No. 5 was a beautiful crystalline product and the writer was very much surprised to get a reaction for sulphates. It also gave evidence of containing a sodium salt. Nos. 3 and 4 were fairly good physically. According to the above analysis they consisted of nothing but a mixture of chromic acid and sodium acid sulphate, obtained by mixing the proper proportions of sulphuric acid and sodium bichromate; $Na_2Cr_2O_7, 2\ H_2O + 2\ H_2SO_4 = 2\ CrO_3 + 2\ NaHSO_4 + 3\ H_2O$; then evaporating the mixture to dryness. These samples may have been intended for technical purposes, but no such information could be found anywhere on the container. It appears to be the custom of some manufacturers, however, to deliver some of their goods without the semblance of a label as to contents or quality; which appears to the writer to be a very dangerous practice.

The above method has also been applied to the soluble chromates with satisfactory results.

LABORATORY OF SMITH, KLINE & FRENCH CO.

DR. CHARLES MOHR, the well-known botanist, died July 17, at Asheville, N. C. He was to be classed with the school of botanists who contributed so much to the development of American Botany.

DR. HENRY C. C. MAISCH, eldest son of the late Professor John M. Maisch, died July 1st, in Philadelphia. In recent years he had devoted himself to pharmaceutical chemistry and analytical work.

CORRESPONDENCE.

Procter Memorial.

In response to a letter from the editor of this Journal concerning the feasibility of establishing a Research Laboratory as a memorial to the life and work of Prof. William Procter, Jr., by the American Pharmaceutical Association at its semi-centennial in 1902, the following are some of the replies which have been received:

Dear Sir:—If sufficient money can be obtained from the pharmacists of America to establish a properly equipped Research Laboratory in Philadelphia, or elsewhere, it seems to me as if no more fitting memorial could be started. Without doubt it is more in accordance with the scientific spirit of the age than anything else yet proposed. In every respect it is ideal in that it alone stands forth as at once a blessing to the future and the payment of our obligation to the past for the heritage of good things it has accumulated for us.

Let us then, if possible, standing as we do in the very centre of the first century of the American Pharmaceutical Association, project into the second half of that century work that will show that we had our hearts in the right place and sought in deeds more than words to prove it. Such a laboratory could do far more for the good of future pharmacists and for the future of the Association than the same amount of money spent in any other direction conceivable. Like a well of pure water it would ever flow on, making the uncultivated and at present desert regions of pharmacy blossom as the rose. A single important discovery made therein might bring, in hard cash, to the pharmacists of the world all that the project would cost and multiply that amount many fold. Other proposals, hitherto made, can only give pleasure to a few. This proposal covers the good of the whole race for all time to come and if carried out will multiply blessings far beyond anything foreseeable. By all means let us try and establish a Research Laboratory, thus proving that we are really alive to the spirit of the

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[1] For other information and correspondence on this subject, see this Journal, November, 1900, and February, March, April, May, June and July, 1901.

twentieth century and not sessile, non-progressive imitators of the methods of the nineteenth and earlier centuries.

BROOKLYN, N. Y. R. G. ECCLES.

DEAR SIR:—Responding to your letter of the 5th inst. relative to the establishment of a research laboratory, in our opinion there is but little room for discussion of the additional proposition or that something of the kind will be an accomplished fact in the near future. Regarding the management, scope and modus operandi of such a laboratory, these will furnish ground for considerable discussion and we are not prepared to express ourselves at the moment. In view of the importance of individual research work that would be connected with the better equipped manufacturing laboratories of the country, the work of such a laboratory as you suggest would naturally follow more general lines and should, we think, have special reference to the needs of the U. S. Pharmacopœia. In the writer's opinion there is room for vast improvement and additions to this valuable work, and he would be glad to see a movement inaugurated that would tend to bring our National Formulary up to the standard of the times. Outside of this, there is a large field in connection with the development of scientific pharmacy as opposed to the commercialism which unfortunately is such a feature of the day. THE WM. S. MERRELL CHEMICAL COMPANY.

CINCINNATI, O.

DEAR SIR:—We acknowledge your favor of April 5th and beg to state that we certainly approve of the idea mentioned, but we hardly know how we can enter into any detailed discussion or expression of opinion other than to endorse the project of a research laboratory.

We are in favor of the undertaking, and we remain,

NEW YORK CITY. LEHN & FINK.

DEAR SIR:—Referring to your favor of April 5th would say, that in reference to the establishment of a research laboratory, that we do not care to express ourselves for publication upon this project, except that you are at liberty to use our name as favorable to the scheme. Pressure of other matters prevents our taking part in the discussion at the present time, although we may do so at a later date. JOHNSON & JOHNSON.

NEW BRUNSWICK, N. J. F. B. KILMER.

DEAR SIR:—Your typewritten letter of February 9th forwarded here where I am wintering.

I, of course, knew Mr. Procter intimately and well, and thought very highly of him. I do not get the JOURNAL, as I am many years retired from any active part in my company, and now an aged man waiting my time to pass over to the great majority.

Mr. Procter was an exceedingly modest man, and I feel as if his best wish in regard to a memorial would be in establishing a scholarship or to secure a medal to the person (student) who did the best work each year in some scientific institution in the line of study he enjoyed most.

Thanking you for your letter, and wishing you success, I am

Very truly,

CAIRO, EGYPT. FREDERICK STEARNS.

DEAR SIR:—I do not know enough about the history of research laboratories to give you an opinion worth anything, regarding the probability of the success of such a project in this country.

Most of the discoveries in science are the result of work to an objective point which is necessary either to the routine or success of some purpose, and if a research laboratory were established by the American Pharmaceutical Association, or by other joint ownership, where skilled and confidential research could be had for a fair consideration, I believe it would be measurably successful, but it seems to me that it would be difficult to raise a large fund for a laboratory in which the interest would be purely scientific and unselfish, and the ends indefinite. HORATIO N. FRASER.

NEW YORK CITY.

DEAR SIR:—I am not exactly sure that I fully understand the purport of your proposition upon which to base an intelligent opinion.

The first essential to success in the establishment of a "Research Laboratory," whether by itself or in connection with some pharmaceutical school, is an ample endowment, a definite revenue, sufficient to attract and compensate the best talent. Upon this basis there would be hope of progress and permanence, for decadence sets in as soon as progress ceases. This principle applies to institutions as well as to individuals.

Again, the field of pharmaceutical research is already somewhat

occupied by the more or less complete equipment of our large pharmaceutical manufacturing establishments, whose incentive is not alone influenced by a sentimental love of science, but rather by the hope of the material rewards following in the wake of successful discoveries.

Human observation and experience teaches that the most enthusiastic advocates of the ideal and abstract are the most tardy in handing out their cash in the realization of the positive and concrete.

As an ample endowment, then, must be the *sine qua non* to the establishment of a research laboratory to commemorate the fiftieth anniversary of the American Pharmaceutical Association, the contribution to that end must be the measure of the sentiment in its favor. JOHN F. PATTON.

YORK, PA.

DEAR SIR:—I should heartily favor the establishment of a Procter Research Laboratory provided some benign pharmaceutical Crœsus could be found to furnish the necessary building fund and an endowment of $250,000 or more. Possibly John D. Rockefeller or your own John Wanamaker can be made to see the desirability of adding a sister institution to the proposed medical research laboratory about to be started by the Standard Oil magnate. At present I feel confident that our wish cannot be realized and some more modest memorial must be selected. I should favor, first, a gold memorial medal like the Hanbury testimonial, to be awarded every two or three years; second a scholarship to be awarded every two or four years. The first is more likely to be realized as it will cost less money and is more likely to be within the grasp of the A.Ph.A. The second would require a much larger fund to be raised by outside subscription. CHAS. CASPARI, JR.

DEAR SIR:—Your request for an expression of opinion with regard to the various suggestions for a suitable memorial for Prof. Wm. Procter has received careful consideration.

(1) The proposition to establish a research laboratory at Washington is not, in my opinion, feasible; not that the money could not be raised to establish the laboratory, but the difficulty would be to *carry it on successfully for a term of years.* It would be far better not to attempt such an ambitious scheme, if it were not

reasonably certain that it could be maintained successfully and creditably for a long time. To start such a laboratory and under the excitement and enthusiasm of a semi-centennial meeting in Philadelphia, collect the money with a "hurrah," and then find a committee, writing begging letters a few years afterwards, to secure the money for its maintenance, would in my opinion be anything but complimentary to the memory of Professor Procter, and yet this has been the history of many such movements.

(2) The proposition to erect a massive bronze monument, to be placed in the City of Washington, in the Capitol Building, or the Smithsonian, is an ambitious plan, without some of the faults of the research laboratory scheme, but it has the disadvantage of being something which would be utterly repugnant to Professor Procter and it is not favored at all by the members of his family now living.

(3) The plan to establish a travelling scholarship, has an element of instability about it which is not attractive. Such a scholarship could, no doubt, be established and it might be maintained for four or five years and then the committee might probably have to send around begging letters to keep it up and the memory of William Procter would suffer to such an extent that those who subscribed would be apt to regret that they ever entertained such a project. In addition to this, Professor Procter's life was spent in building up American pharmacy, and whilst some European institutions are greatly in advance of America in teaching chemistry, it has yet to be shown that they are superior to the colleges and universities on American soil in teaching pharmacy. We must not forget that whilst Professor Procter was a chemist, pharmacy was the science which he ennobled by his writings, his teaching and his experiments.

(4) Mr. Whitney's plan of a well-designed certificate and medal to be issued by the American Pharmaceutical Association, to be awarded to worthy followers of Procter for special services or attainments, would undoubtedly be practicable, and serve to extend the influence of Procter's life amongst the present and future generations, and, in my opinion, this is the direction in which the memorial should be established, the guiding principle being to place before the young pharmacists of America the life of William Procter, and *keep it before them* as long as possible. Now, to do this, a permanent fund must be created, say $8,000 or $10,000. Let this sum be securely

invested, which would probably yield $300 per annum; this would be sufficient to found a Procter Memorial gold medal to be awarded annually to those who have rendered distinguished service to pharmacy and collateral sciences, and be the American counterpart of the British Flückiger-Hanbury medal. This sum would also permit the annual awarding of a smaller gold medal and beautifully engraved certificate to young American pharmacists by a plan like that of ex-President Whitney's. My reasons for preferring these two forms of memorials are, that in the first place the memory of William Procter would be maintained for a much longer term of years, and that the interests to which his life was devoted, *i.e.* that of pharmaceutical education, would be most directly touched and benefited by making the name and work of William Procter, household words among the present and future generations of young pharmacists; and, lastly, the plan is stable and permanent, because the principal would be secured and in hand, and the interest devoted to the objects named, *with no cost for maintenance.*

JOSEPH P. REMINGTON.

PHILADELPHIA.

DEAR SIR:—Concerning the feasibility of establishing a Research Laboratory under the auspices of the American Pharmaceutical Asssociation, I entertain so much doubt that I would rather not place myself on record except in so far that I should consider its accomplishment a great step in advance. I take this opportunity, however, to say something in reference to a "Procter Memorial." It goes without saying that I am heartily in favor of some emphatic recognition of the life-work of my dear friend and teacher, the late Prof. Wm. Procter, Jr., by the American Pharmaceutical Association, and I regard the approaching semi-centennial meeting of that association as the most fitting time for the purpose. I moreover heartily endorse the idea that the name of Wm. Procter, Jr., should be coupled with that of Edward R. Squibb, his life-long friend and most intimate co-laborer in the cause of pharmaceutical advancement. As to the character of the memorial—bearing in mind the natural modesty, earnestness of purpose, and simplicity so characteristic of both, their averseness to all ostentation—it seems to me that it would most fittingly take the shape suggested by Dr. Frederick Hoffmann, namely, "the institution of a prize medal to be granted by the American Pharmaceu-

tical Association in recognition of superior discoveries or literary accomplishments in the domain of theoretical and applied pharmaceutical sciences and arts." This medal, of appropriate and artistic design, should be simply constructed of bronze; but its award should carry with it—as something of substantial and permanent value—a life membership in the American Pharmaceutical Association, and prominent publicity in the printed proceedings of that Association.

C. LEWIS DIEHL.

LOUISVILLE, KY.

DEAR SIR:—Concerning the research laboratory; after having revolved the matter carefully in my mind I give you herewith the benefit of my decision, if of any value whatever to you. In my opinion, a step in that direction would be desirable provided it could be inaugurated in such a way as to make it a success without any question of doubt whatever. There must be no mistake of management, there must be no error of judgment, and that we may comprehend what we have to meet in this direction in order to make the work creditable to the fiftieth anniversary of the Association, I will take the liberty of jotting down a part of the problem that has come to my mind since I began to reflect over the subject.

This research laboratory, if instituted, would have as friendly rivals, or perhaps, I might say as friendly competitors for position, the research work that is being done now in the universities of this country, the colleges of pharmacy in this country and the great manufacturing establishments. It would not be creditable to the American Pharmaceutical Association to institute a research laboratory that would not in every way meet the work done in these other directions. In order to accomplish this result a certain amount of money would be necessary. Let us not close our eyes to this fact. It is not a question of will, or wish, or hope or desire, but a question of business. A research laboratory, in order to be a research laboratory, must be conducted by men who make this work their thought, by men who have the ability to act and to do, by men who in order to have an opportunity to devote their time in this direction should be paid a salary commensurate with the responsibility they take upon themselves. It should not be a charity matter, it should not be an imposition on men who cannot afford to devote their time in this direction, but it should be in every sense of the

word a research laboratory conducted on broad grounds and conducted by men of unimpeachable education.

The question is, then, in thinking over this matter, can such a laboratory be founded? A research laboratory that will not only last for a day, or for a year, but for a period of time that will credit the laboratory established by a great society on its fiftieth anniversary of existence. In matters of this kind, the thought problem which I present herewith, is, in my opinion, the FIRST problem to consider, and in matters of this kind it strikes me, persons enthusiastic, and justly so, in behalf of the work to be accomplished should properly consider it fairly and squarely.

I will sum up by the single sentence. Admit without a question that a research laboratory for the American Pharmaceutical Association is desirable and could be made creditable and useful under proper conditions, *are the conditions such as to warrant us in moving in this direction?* Let me hope that the answer may be yes, and that the answer to this part of the question may be a reply which will make no doubt concerning the question of finances.

CINCINNATI, O. JOHN URI LLOYD.

RECENT LITERATURE RELATING TO PHARMACY.

PRESENCE OF COPPER IN NUX VOMICA.

There have recently appeared in the pharmaceutical press, reports of considerable quantity of copper found in nux vomica, even to $\frac{24}{100}$ of 1 per cent. A. Beitter (*Ber. dtsch. Ph. Ges.*, 1900, 411) discusses the subject, reporting that his examinations of nux vomica, while showing copper, indicated such minute quantities that assaying was out of the question. He found in many cases that the copper was not indicated by its well-known tests with hydrogen sulphide and with ammonia water. He, however, obtained positive results from practically every specimen of nux vomica and ignatia bean, and also from the seed of Strychnos Gaultheriana by testing with the Klunger-Schär reaction, viz.: treatment of the suspected copper compound with dilute solution of aloin, when a yellow color results. A trace of sodium chloride and gentle warming brings red color. This test he finds indicates copper in a 1 to 100,000 solution. H. V. ARNY.

EMODIN IN SENNA.

Tschirch and Hiepe (*Sch. Woch. Ch. u. Ph.*, 1900, 55) reports on the assay of senna based on the quantity of emodin contained. The results are somewhat surprising. For instance, the senna pods yield more emodin (1·15 per cent.) than the leaves (·7 to 1 per cent.). Moreover, the Alxeandria and Tripoli senna yield more emodin than the much vaunted Tinnevelly senna, the latter yielding but ·8 per cent. Frangula yields 2·6 per cent. of emodin. Cascara sagrada ·6 per cent., while rhubarb contains 1·5 per cent. This report seems to show that in the purgative drugs, save perhaps senna, emodin is not the sole active principle. H. V. A.

EXAMINATION OF COOKING OILS.

Comparing methods of distinction between olive, cotton seed, maw seed and nut oils, Kreis and Grob (*Schw. Woch. Ch. und Ph.*, 1901, 88), find Billier's reaction the best. This consists in shaking the oil with a benzol solution of resorcin and with nitric acid, under which treatment the color of olive oil is unchanged, while that of cotton-seed and nut becomes red violet, and maw seed oil is turned brown red. H. V. A.

PHARMACY LAWS AND LEGISLATION.

CONTRIBUTED BY PROF. J. H. BEAL, SCIO, O.

(Under this title it is designed to give each month a brief *résumé* of proposed and accomplished pharmacy legislation, and of decisions of importance to pharmacy boards and pharmacists. On account of space limitations, proposed legislation cannot be more than briefly mentioned, but bills enacted into law will be discussed and their principal features pointed out. Pharmacy boards and members of legislative committees and others are requested to send copies of such measures and news of this kind either to the editor of this JOURNAL, or to Prof. J. H. Beal, Scio, O.)

DECISIONS OF INTEREST TO PHARMACISTS.

An interesting decision, although along the line of decisions in similar cases, has been handed down by the Supreme Court of Iowa in the case of Burgess *vs.* The Sims Drug Company.

In this case the defendant's clerk made a mistake in the preparation of an eye lotion which resulted in the loss of an eye to the

plaintiff. The line of the defendant's argument was that he had exercised due care and caution in employing a graduate pharmacist and therefore was not responsible, citing in defense of this position that railways were not responsible for damages resulting from the negligence of their surgeons, nor banks for the mistakes of their notaries. The court denied the validity of this argument, holding that as the practice of surgery was not the province of a railway company, nor notarial services the business of a bank, these had exercised due care and skill when they had selected properly qualified surgeons and notaries, but that the filling of prescriptions being the special province of a pharmacist, the latter could not escape liability by delegating his own proper function to another person.

In the case against Maurer, of Philadelphia, for the sale of Canadian phenacetine in the United States, the United States Circuit Court, for the Eastern District of Pennsylvania, has handed down a decision affirming in general terms the validity of the Hinsberger patent. As this was generally regarded as a test case, the decision may fairly be regarded as settling the right of the patentee and his assigns to the exclusive right to sell phenacetine within the territories of the United States.

A temporary injunction has been obtained by Ralph P. Hoagland, a cutting druggist of Boston, in his suit against the Eastern Drug Company and others, to restrain them from interfering with the plaintiff's business. The allegations of the plaintiff's bill set out that the defendants have interfered with his buying and selling of drugs because he has refused to join the defendants' association which seeks to maintain prices, etc.

A recent decision of the Massachusetts Supreme Court holds that a person who pleads guilty of the illegal sale of intoxicating liquors has been "convicted" within the meaning of the law which authorizes the Board of Pharmacy to revoke the registration certificate of a druggist "convicted (for such offense) before a court of competent jurisdiction."

Two recent Cincinnati decisions regarding the sale of poisons, are of interest to pharmacists.

In one case the defendant druggist sold arsenic to a servant, a

stranger, who claimed that the poison was desired for rats, but who instead mixed the same with the breakfast oatmeal, causing the dangerous illness of those who ate of the same. The petition being demurred to, was held by the court to present a good cause of action.

In the second case a colored boy purchased "Rough on Rats" which he placed in a pot of coffee, killing his brother and nearly causing the death of his father. In deciding against the demurrer to the complaint the court held, That (under the Ohio law) the sale of a poison to a minor without a prescription renders the seller responsible to the innocent sufferer from its administration.

Coincident with the extension of the work of the N.A.R.D. came the news of suits in different parts of the country brought by cutters against the local associations for conspiracy in attempting to prevent the cutters from obtaining supplies. As the conditions are in a certain sense new, and unlike the cases in restraint of trade which have heretofore engaged the attention of the courts, the outcome of the cases will be watched with interest. The fortunes of the several suits will probably vary with the manner in which the issues have been presented by the pleadings, but it is coming to be more and more recognized that manufacturers and others have the right to require a contract from those who handle such goods to sell them at the price agreed upon, and to enforce such contracts when made.

ILLINOIS.

The Bill amending the Pharmacy Law has become a law, and will be printed in a later number of this JOURNAL.

Two other bills now pending require the formulas of proprietary medicines to be printed upon the label, and still another would require such preparations to have attached a copy of a certificate of the Board of Health, stating that the preparation has been examined by the Board, that it is harmless, and an appropriate remedy for the disease for which it is recommended.

The so-called "Soda Fountain Bill" which sought to regulate the structure of soda fountains and the manner of keeping syrups, etc., has been defeated, as it ought to have been. The benefits to be derived from such a law are largely, if not altogether, imaginary, the injury done by it would have been real and immense.

NEW YORK.

The bill to regulate the storage of explosive and combustible substances in the city of New York, mentioned in the May number of this JOURNAL, after passing both houses of the Legislature was vetoed by the Governor on the ground that its provisions are already embraced in the new charter which is to take effect January 1, 1902.

The Costello Bill, previously mentioned in this JOURNAL, has been enacted into law. While in some respects the bill is not far from justice, as a whole it is not to be commended. It permits the dispensing of medicines by physicians, allows general dealers to sell domestic remedies, and authorizes the State Board to grant permits without examination to persons having experience in dealing in drugs and medicines to compound and dispense upon payment of an annual fee of $3.00. The text of the bill will be given in a later issue.

PENNSYLVANIA.

A recently enacted law prohibits the distribution of trial samples of medicines, dyes, inks, etc., in such form or manner as will permit them to come easily into the hands of children, but does not interfere with the distribution of such articles directly to adults.

OTHER NEW LAWS.

Other laws have been enacted in California, Rhode Island, and Nevada. The latter is quite a comprehensive measure, and presents a number of commendable features. It is intended to print these laws in full in a subsequent number of this JOURNAL.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

ANNUAL AND ANALYTICAL CYCLOPÆDIA OF PRACTICAL MEDICINE. By Charles E. de M. Sajous and one hundred associate editors, assisted by corresponding editors, collaborators and correspondents. Illustrated with chromo-lithographs, engravings and maps. Vol. VI. Philadelphia, New York, Chicago: F. A. Davis Company. 1901.

This volume is the last of the first series and contains, like

the preceding volumes, a large number of valuable articles. Among these may be mentioned: "Rheumatism," by F. Levison; "Diseases of the Stomach," by D. D. Stewart; "Surgery of the Stomach and Intestines," by W. W. Keen and M. B. Tinker; "Surgery of the Spine," by R. H. Sayre; "Syphilis," by G. F. Lydston; "Surgery of the Urinary System," by J. W. White and A. C. Wood; "Diseases of the Uterus," by H. T. Byford; "Diseases of the Uterine Adnexa," by E. E. Montgomery; Wounds and Injuries of the Chest," by L. A. Stimson and E. L. Keyes, Jr., and "Yellow Fever," by W. Wyman.

These remarkable books are probably not duplicated in medicine, as they contain not only what is usual in books on practice of medicine, but considerable space is devoted to surgical subjects. The progress of the past decade is recorded and in many instances original work was instituted to solve the problems that the research workers had not as yet attempted. The various specialties have received consideration, the newer the rapeutics has been introduced and, in short, everything has been done to make the work an original, valuable and advanced encyclopædia of the entire field of practical medicine. The general index accompanying this volume is a model of its kind, and illustrates how much matter is usually lost sight of in the encyclopædic works because of this lack of systematic arrangement. There have been few books so ably edited, so full of information, and so arranged that every subject on which information is desired may be readily consulted.

NOTES ON EQUATION WRITING AND CHEMICAL AND PHARMACEUTICAL ARITHMETIC. Second edition, revised and enlarged. By J. H. Beal. Pittsburg: The Calumet Publishing Company.

The first edition of this book was published by the author for the benefit of his students, without any thought of a more extended circulation. But as with all books on such subjects, if there is anything to commend them, they are likely to be used in a much wider sphere than is anticipated. This is the case with Beal's "Equation Writing and Chemical and Pharmaceutical Arithmetic." The work is a good pharmaceutical stoichiometry, and the chapters on equation writing will make the work of such value that it will doubtless replace Barker's "Chemistry," for this purpose, which has so long been used by students beginning the study of chemistry.

The work consists of: Part I—Equation Writing; (1) General Principles; (2 and 3) Nomenclature, Notation and Classification of the Elements, and Inorganic Compounds; (4) the Writing of Chemical Formulæ; (5) Construction and Interpretation of Equations; (6) Oxidation and Reduction, Spelling and Pronunciation of Chemical Terms. Part II—Chemical and Pharmaceutical Arithmetic; (7) Important Data Employed in the Problems in Part II; (8) Calculations Based on Chemical Formulæ; (9) Calculations Based on Equations; (10) Calculations Involving the Weights and Volumes of Gases; (11) Calculations Involving the Weights, Volumes and Specific Gravities of Liquids and Solids; (12) Percentage Solutions and Mixtures; (13) Alligation or Adjustment of Percentages and Specific Gravities.

There are a number of new things in the book, or rather a new way of treating modern facts and theories, as in the use of the term Microcrith; the nomenclature of alkaloidal salts; the theory of doubled formulæ, etc. The book is one which not only beginners in chemistry will use with profit, but teachers and others will enjoy having, as there is a good deal of valuable matter contained therein.

OBITUARY.

HANS M. WILDER.

Hans M. Wilder was born in the island of Iceland in March, 1831. His parents were Danes and lived in the city of Copenhagen, Hans having been born while his parents were on a visit to Iceland. He spent his boyhood in Denmark, entering the gymnasium when he was five years old. In his eleventh year he was transferred to the Latin school. On account of his father's death, and the straitened circumstances of the family, he was unable to continue at school, and he was therefore apprenticed to an apothecary; at the end of four years he took his junior examination, and three and a half years afterwards passed his Major Candidatus. While still a clerk in the drug store his mother died, and soon after with a small sum of money which had been bequeathed to him, he began to satisfy his roving disposition, going first to France, where he stayed six months with a relative in Rheims. After travelling through France he set sail for St. Croix, West Indies, and after being here three years he sailed for the United States in 1860, land-

ing in Philadelphia. He subsequently travelled from Chicago down the Mississippi on a steamboat to New Orleans.

In 1861 he returned to New York, and in 1863 he sailed for Puerto Plata, San Domingo. He was present in this island during one of the periodical revolts, and had some hairbreadth escapes, sailed for New York, and subsequently, in Philadelphia, enlisted as a surgeon steward on the "Tunxis" (a light draft monitor). He did not relish a life on the monitor, and going ashore, enlisted in Company I, Thirty-fourth New Jersey Regiment, and was sent to Cairo, Ill. From here the Army of the Gulf went to New Orleans, but before Hans Wilder saw a battle he was taken ill, and sent home from Mobile Bay to New York.

Soon after he went to Chicago, where he was employed as a drug clerk in different stores for two years. He then returned to New York, and sailed for San Francisco, and upon his arrival here he determined to try silver mining at Silver City, Nev. He was a silver miner for half a day, then went back to the drug business; but he was only three months in his position before he returned to San Francisco, and a few months afterward he was a sailor before the mast on his way to Liverpool.

From here he went to Copenhagen, only to remain a short time, when he left for Philadelphia in 1868; here he bought a drug store on Girard Avenue, which he sold out soon afterward, and bought another at Fifth and Poplar Streets; this he sold out in 1876, and then went again to New York as relief clerk.

From 1879 to 1881 he was the clerk of the College of Pharmacy in the city of New York, then travelled to Detroit, Chicago, Cincinnati and Louisville, and was called back to Detroit to edit the *New Idea* for Frederick Stearns & Co. He stayed here for two years and then returned to Philadelphia, where he died January 25, 1901.

Hans M. Wilder was a pharmacist of ability, and he had rare linguistic talents. He was particularly fond of making indexes and abstracts from journals, having compiled indexes for the AMERICAN JOURNAL OF PHARMACY, *Proceedings of the American Pharmaceutical Association*, and other scientific bodies. He frequently contributed articles to the pharmaceutical journals; "Polyhistor" was his *nom de plume*, and he was engaged for two years as a writer for the *Druggists' Circular*. Probably his most remarkable achievement was

the cataloguing and arranging of coin collections. His knowledge of various languages was of great assistance here, while his careful, accurate pharmaceutical habits were of much assistance in training for this work.

His was a familiar figure in the halls of the Philadelphia College of Pharmacy, and he had an excellent working knowledge of pharmaceutical and medical books in all languages. He was unmarried, and up to the time of his death enjoyed good health. He died suddenly in the library of the American Philosophical Society, January 25, 1901, of a stroke of apoplexy. His sorrowing friends took charge of the remains, which now lie peacefully in Northwood Cemetery, Philadelphia. J. P. R.

DR. LAWRENCE TURNBULL.

On October 24, 1900, this eminent medical practitioner passed away at his home, in this city. He was born in Shotts, Lanarkshire, Scotland, in 1821. At the age of 17 he came to America and shortly thereafter engaged in the drug business with John Bringhurst. He entered the Philadelphia College of Pharmacy and was graduated therefrom in 1842. His inaugural thesis was a meritorious paper upon the bark of the American Aspen, Populus tremuloides, his investigation proving the presence of salicin as the active constituent (AMERICAN JOURNAL OF PHARMACY 1843, page 275).

Subsequently, he was employed in the chemical laboratory of the late Frederick Brown, and while engaged there he published several contributions to pharmaceutical literature. His formulas for the preparation of the scale salts of citrate of iron and citrate of iron and quinine, which have since become popular remedies, attracted considerable attention and in recognition of his skill the Franklin Institute awarded him a certificate of merit. Dr. Turnbull is credited with the discovery of the bleaching effect of sodium borate upon ointments and oils.

Deciding upon the study of medicine he secured as his preceptor Dr. John K. Mitchell and was graduated in 1845 from the Jefferson Medical College.

For several winters he lectured at the Franklin Institute on chemistry as applied to the arts.

In 1850, the chair of Materia Medica in the Philadelphia College of Pharmacy became vacant by the resignation of Professor Joseph

Carson and Dr. Lawrence Turnbull was mentioned as a candidate to fill the vacancy.

He selected as his special field of study the diseases affecting the ear, and soon became recognized as an authority in this department by such able surgeons as Professor D. Hayes Agnew and Professor Samuel D. Gross.

He took great pleasure in establishing this department of tuition in the Jefferson Medical College. For many years, he was also connected with the Department of Diseases of Eye and Ear at the Howard Hospital.

Dr. Turnbull contributed a number of valuable papers to medical literature and also several text-books on diseases of the ear and aural surgery which have been standard works and have added greatly to his established international reputation as an authority on Otology.

While only a short period of his life was occupied with the duties of the apothecary, yet in the sphere of the pharmacist his ability received the first recognition. His training in pharmacy and chemistry, undoubtedly, whetted his appetite for study and his ability for keen observation that were prominent characteristics in his after success.

G. M. B.

WILLIAM R. WARNER.

William Richard Warner was born on December 25, 1836, in Caroline County, Maryland. His parents dying when he was quite young, he lived with an uncle for a short time, when the uncle likewise died and thus William was thrown on his own resources at a very early age.

He obtained a rudimentary education in a country school and a limited course in the academy at Easton, Md.

He entered the employ of Chamberlain & Anderson, druggists, of Easton, Md., and assiduously applied himself to mastering the details of his chosen calling. He roomed in the loft over the store and fortunately he found stored away here, a number of valuable scientific books. With a yearning for more extensive acquaintance with the sciences, William was not slow to take advantage of this fortunate circumstance. The natural bent of his mind was demonstrated and we find him studying geology, botany, palæontology and chemistry and applying them practically to his surroundings.

While a mere youth he is said to have contributed to the local

papers, several contributions on scientific subjects. He possessed considerable skill as a taxidermist and made extensive collections of birds.

Entering the Philadelphia College of Pharmacy, he was graduated therefrom in 1856 and immediately engaged on a lecturing tour through Pennsylvania, delivering a series of lectures on chemical physics.

Mr. Warner opened a store at Second and Girard Avenue. Being ambitious, he was not content with the retail business and gradually engaged in manufacturing, and selling out his retail business, he now located at 154 North Third Street as a wholesaler. He engaged extensively in the manufacture of sugar-coated pills and granules and sought foreign as well as home markets for his products.

In 1876, the firm removed to a six-story building, 1228 Market Street, and there engaged in manufacturing a more extended line of pharmaceuticals. This building becoming inadequate for their manufacturing business, a lot at Broad and Wallace Streets was procured and a ten-story building, known as "Warner Hall," was erected. Here the laboratories were established and after the disastrous fire in 1899, which destroyed their Market Street building, the entire business of the firm was removed to this place.

Wm. R. Warner joined the Philadelphia College of Pharmacy in 1858 and was a life member. For several years after graduating from the College he took quite an interest in matters relating to scientific pharmacy and contributed a number of articles to pharmaceutical literature, ten papers appearing in the AMERICAN JOURNAL OF PHARMACY. For several years he served on the Herbarium Committee, associated with the late Prof. John M. Maisch. Later, the details of business engrossed his thoughts and here he exhibited the same energy and avidity for mastering the problems of commerce and manufacture. He was also the possessor of a valuable collection of paintings, especially rich in portraits of noted men.

Wm. R. Warner was taken ill in New York while on a business trip and was brought home suffering from a general collapse. After suffering for three weeks he was striken with a second stroke of paralysis on the morning of April 3d and died in a short time. He is survived by three sons, who will continue the business of manufacturing pharmacists under the old firm title. G. M. B.

AUGUST WEBER.

Mr. August Weber, who was a member of the College for many years, died March 7, 1901, at the age of 63 years. He was born at Hessen-Darmstadt, July 12, 1838. He was educated in Germany, and entered a drug store to learn the business. He pursued his studies in chemistry and pharmacy at the University of Giesen, graduating from that institution. He came to this country in 1857, and went to Allentown, where he took charge of Mr. Clump's drug store. He moved to Ashland in 1861, and three years later came to Philadelphia, where he opened a drug store at 634 Washington Avenue. In 1866 he removed to the corner of Sixth Street and Washington Avenue, where he successfully carried on his business till the time of his death. He became a member of the College June 4, 1872, and while prevented by his duties from attending its meetings, he always took a lively interest in pharmacy, and spent considerable time in reading the literature related to that subject. Mr. Weber was exceedingly conscientious and exact in all his work and dealings, a good and kind husband and father, upright and just and respected by all who knew him. In the spring of 1897 Mr. Weber had an attack of sickness, and by the advice of his physician went abroad and spent several months in his native land, seeking rest and renewed strength. He returned much benefited, and was able to resume his duties up to the present year, when he was stricken with paralysis, which, in a short time, was followed by his death. He leaves a widow and five sons and a daughter. One of his sons, Herman Weber, continues the business. G. P.

JAMES G. WELLS.

James G. Wells was born June 24, 1839, near Port Kennedy, in Norriton Township, about two miles from Norristown, Pa. His parents were William Ellis and Hepsey (Norris) Wells. He was a descendant of Isaac Norris, who was the close friend of William Penn, and owner of the greater part of Norriton Township, includthe present site of Norristown.

His father died while he was quite young, and the family subsequently removed to Norristown. He was educated at the school of Rev. Samuel Aaron, in Norristown.

In 1856 he came to Philadelphia and engaged in the drug business with David Stackhouse, at Eighth and Green Streets, and enter-

ing the Philadelphia College of Pharmacy he was graduated therefrom in 1860. In August, 1862, he entered the Union Army as Hospital Steward of the 138th Regiment of Pennsylvania Volunteers, and served as such until the close of the war.

He then secured the drug store at Ninth and Spring Garden Streets. He was a man of sterling qualities, and successfully conducted his business here for twenty-eight years, when he disposed of his store and retired.

Mr. Wells joined the Philadelphia College of Pharmacy in 1872, and was a life member. He was a prominent Mason, and a member of Post No. 2, G. A. R. He was a director of the People's Bank. He was greatly interested in the work of the Spring Garden Soup Society, of which he was President for many years.

Mr. Wells married Elizabeth, daughter of Isaac and Elizabeth Walker, of Chester Valley, who, with one daughter, Hepsey Norris Wells, survives him.

For several years Mr. Wells had been in declining health, and had two slight strokes of paralysis within a year. He died suddenly on July 19, 1900, of angina pectoris, in Chester Valley, where he and his wife and daughter had been accustomed to spend the summer months.

C. A. W.

PHILADELPHIA COLLEGE OF PHARMACY.

The quarterly meeting of the members of the Philadelphia College of Pharmacy was held June 24, 1901, the President, Howard B. French, in the chair; twenty-five members were present. The minutes of the annual meeting, held March 25th, were read and approved as read.

The minutes of the meeting of the Board of Trustees for April and May were read by the Registrar, W. Nelson Stem, and approved as read. The minutes of the June meeting were not read, the President ruling that as they had not been approved by the Board it would be premature for the College to approve them.

Mr. Beringer, for the Committee on Necrology, presented the report for the year. He stated that he had been assisted by other members of the College and would read the memoirs except that of Dr. E. R. Squibb by title, and moved their acceptance and that they be referred to the editor of the JOURNAL for publication. So ordered.

Memoirs were presented of August Weber, prepared by Gustavus Pile; of Wm. R. Warner and Dr. Lawrence Turnbull, prepared by George M. Beringer; James G. Wells, prepared by Dr. C. A. Weidemann; of Dr. E. R. Squibb and Hans M. Wilder, by Prof. Joseph P. Remington; of Dr. Theodore Husemann, by Prof. Henry Kraemer.

The Committee on Resolutions on the death of Dr. Charles Rice, consisting

of Messrs. Remington, Beringer and Kraemer, presented the following, which was adopted :

WHEREAS, The Philadelphia College of Pharmacy has learned of the death on Monday, May 13, 1901, of our esteemed honorary member, Charles Rice, Ph.D., Ph.M., Chairman of the Committee of Revision of the United States Pharmacopœia, be it therefore,

Resolved, That we hereby express our appreciation of his great natural ability, scholarly attainments and nobleness of character, which not only gained for him the profound admiration of the pharmaceutical and medical professions throughout the world, but which endeared him to all who either came in contact with him personally or who had more remote relations with him.

The enormous amount of efficient work that he accomplished on the United States Pharmacopœia during the last twenty years as Chairman of the Revision Committee has done much toward elevating our national standard to its acknowledged advanced scientific standing. His personality is indelibly impressed on its pages and his influence will extend throughout future revisions, and thus continue to attest his especial fitness for conducting Pharmacopœial work.

Perfection of style, simplicity and thoroughness have always characterized his contributions to pharmaceutical literature, and not less marked has been his willingness to sacrifice time, efforts and means to advance the interests of his profession.

The results accomplished during his life remain as a lasting memorial, more impressive than any monument in his honor, and one which will always appeal to the pharmacist as an ideal worthy of our emulation.

Resolved, That the officers and members of the Philadelphia College of Pharmacy by this memorial minute, desire to express their profound sorrow at the removal by death of this unselfish and zealous worker in the field of pharmacy, and to record their admiration for the personal character and services of Dr. Charles Rice, and with it their appreciation of the immeasurable loss which American pharmacy has sustained by his demise, a loss which must be severely felt throughout the pharmaceutical world.

The President appointed the following committees : Committee on Necrology, George M. Beringer, Prof. Henry Kraemer, Gustavus Pile. Committee on Nominations, Joseph W. England, Harry L. Stiles, Jacob M. Baer, Theodore Campbell, Henry C. Blair.

Dr. C. B. Lowe alluded to the botanical specimens gathered in the vicinity of Washington, Pa., by Mr. Isaac M. Weills, and donated to the College by him, and moved that a vote of thanks be tendered the donor, which was adopted.

Communications were read from Charles Mohr, of Asheville, N. C., Helen Abbott Michael, of Boston, Mass., and Prof. Dr. Arthur Meyer, of Marburg, Germany, acknowledging receipt of notification of their election to honorary membership in the College. Professor Kraemer also read a portion of a letter from Dr. Charles Rice which he received a short time before his death, in which he expressed his appreciation of his election as an honorary member in this College.

Two applications for membership were received and referred to appropriate committees.

C. A. WEIDEMANN, M.D.,
Secretary.

EDWARD ROBINSON SQUIBB, M.D.

THE AMERICAN
JOURNAL OF PHARMACY

SEPTEMBER, 1901.

EDWARD ROBINSON SQUIBB, M.D.[1]

By Joseph P. Remington.

Edward Robinson Squibb was born in Wilmington, Del., July 4, 1819. His parents were James R. Squibb and Catherine H., his wife. His early education was received in Wilmington, and at the age of eighteen he was apprenticed to Warder Morris, a druggist in Philadelphia, and from 1837 to 1842 he learned the drug business with the houses of Warder Morris and J. H. Sprague.

He had long desired to acquire a medical degree, and he rightly judged that there could be no better preparation for his work than experience in the drug business. In addition to this, as his parents' means were slender, he could earn something, and, at least, be self-supporting during these early years of study.

As is so often the case with distinguished men, these early years were not marked by any especial aptitude for medicine or pharmacy, as he was himself frequently heard to declare. In 1842, at the age of twenty-three, he matriculated in Jefferson Medical College, of Philadelphia, and received the degree of Doctor from that College on March 20, 1845.

His steadiness and ability were at once recognized by his *Alma Mater*, and he was elected Assistant Demonstrator of Anatomy, Curator of the Museum and Clerk of the Clinic.

He practised medicine in Philadelphia until 1847, when he con-

[1]The accompanying likeness of Dr. Squibb first appeared in the *Medical News*, November 3, 1900, the photograph having been made two years before Dr. Squibb's death.—Editor.

cluded to enter the Navy, and, passing the examination before the Naval Board, received his commission as Assistant Surgeon in the United States Navy on April 26, 1847, the document bearing the signature of James K. Polk, then President of the United States, and J. Y. Mason, Secretary of the Navy.

At the close of the Mexican War he was assigned to service on U. S. Brig "Perry;" subsequently, the "Perry" was engaged in breaking up the South American slave trade, which was then actively carried on by vessels owned in the United States. He saw active sea service for four years, and became, as he often said, very tired of having so little to do. In January, 1852, he was fortunately ordered to the Naval Hospital in Brooklyn, which at that time had for its Director, Dr. Benjamin Franklin Bache, a worthy member of a distinguished family whose services to their country should never be forgotten.

While serving in the Navy, Dr. Squibb had abundant opportunities of observing the poor quality of many of the medical supplies furnished to the Navy; these goods were bought upon the contract system, and from the lowest bidders; but through the efforts of Dr. Bache, Dr. Squibb and other officers, Congress was induced to make an exception in the case of medical supplies and gunpowder, and "quality first and price second" became the rule of the Department.

In addition to this, the Navy Department was authorized to establish a pharmaceutical laboratory for the manufacture of important articles on the list of naval supplies. This laboratory was organized, built and equipped with the names of Dr. Benjamin Franklin Bache as Director, and Dr. Edward Robinson Squibb as Assistant Director, in 1852. At this time, ether was coming into general use as an anæsthetic, and it was here, probably, that ether was first made by steam heat, thereby lessening the great danger of explosions and accidents through the inflammability of the liquid and its vapor. But one thing is certain, that Dr. Squibb gained in his small laboratory a practical knowledge and experience in manufacturing which was destined to yield enormous results.

The success of this laboratory induced Dr. J. Lawrence Smith to make a proposition to build, equip and start a similar enterprise in the city of Louisville, Ky. Dr. Squibb accepted the proposition, and in 1857 he resigned his commission in the Navy and returned to civil life.

In 1858, the naval laboratory, having proved its value to the government, attracted the attention of the War Department, but opposition to the establishment of an army laboratory was developed, and Dr. Squibb was induced by Dr. R. S. Satterlee, Chief Medical Purveyor of the Army, to establish a laboratory of his own, and sell to the Army such of the products as might be required.

Towards the close of the year 1858 the four-story brick building, No. 149 Furman Street, Brooklyn, was secured, and Dr. Squibb at last found himself in the position towards which he had been looking forward for many years, that of owning and directing a laboratory where he would be untrammeled by traditions of any kind, and have the opportunity of establishing his own standards. This laboratory had for its nucleus the furnishing of such supplies to the Army as were needed, but it could readily be seen that the medical wants of an army of 25,000 men would not support even a laboratory of this size. The medical profession of Brooklyn at once took a great interest in this movement, and success was fairly in sight, when, on the evening of December 24, 1858, the building was entirely destroyed by fire, and the owner so badly burned that his life was despaired of for many months; but his strong constitution, the enthusiastic attentions of his medical friends in Brooklyn, coupled with the devoted services of his wife, saved him. But his face and hands were badly disfigured for life through the burning ether which was thrown on his face.

The accident occurred through the carelessness of one of the employees overturning a bottle of ether on the counter, the liquid quickly taking fire from an alcohol lamp which was burning some distance away. Dr. Squibb's face and hands were very badly burned in attempting to save his books, and when he emerged from the building he could scarcely be recognized. Kind friends took him home, and his wife was summoned, she happening to be with her sister at the time. A sad shock awaited her when she found the doctor lying quietly on his bed, but suffering terribly. It was undoubtedly the saddest Christmas Eve that they ever experienced. For months his life hung in the balance, and when he emerged from his room, no trace of his once handsome features remained. His eyelids were everted permanently, and for many years he was compelled to wear protectors when out in the open air, during the

winter season. This accident greatly influenced the doctor's future life. Having a sensitive disposition, he shrank from publicity, and when he was compelled to meet strangers, he knew that even if they were polite enough not to ask him the cause of his disfigurement, that they would feel a curiosity to know the details of the accident. A little incident which occurred when the writer was crossing in the ferryboat in company with the Doctor will illustrate some of the daily annoyances to which he was subjected. A badly bred young girl, noticing his eye protectors, rushed up in front of him, and barring his way as he passed through the cabin, exclaimed loudly, "Why just look at this man; he's got no eyes!" The doctor simply and quietly said, "No, little girl, I can see well enough;" but the cheerful tone of his conversation stopped instantly, and it could be easily seen why he never cared to be prominent in such mixed company. He never spoke of these annoyances, and rarely alluded to his accident, and then never complainingly. The tears ran from his eyes continually, some of the ducts being partially destroyed or injured permanently. And when to this is added the fact that for forty-two years he was compelled every night to strap his eyelids together with strips of isinglass plaster in order to obtain rest for them, one can form some idea of the lasting results of that unfortunate Christmas Eve fire.

His indomitable spirit, however, was not quenched; he set to work with more determination than ever. His medical friends never deserted him; they furnished him capital, and by the middle of 1859 the laboratory was rebuilt and active work resumed. Upon the outbreak of the Civil War, in 1861, the needs of the Army became very large, and additional buildings were hired and equipped, and for the time, run night and day, but under such disadvantages that in 1862 another site was purchased and a large and commodious laboratory was erected on Doughty Street, Brooklyn, which was occupied January 1, 1863.

These laboratories have been models ever since their erection. Their massive walls and foundations and solid floors bespoke the character of the man. Nothing for show or ornament, but everything for simplicity, stability and strength.

Dr. Squibb had an especial aptitude for devising apparatus, and he not only exercised his talents in this direction constantly, but he was willing to give freely the result of his labors to any who called

upon him. He more than once furnished working plans to his competitors in business for the famous apparatus for making ether. He did not believe it proper from a scientific point of view, to withhold any secrets in manufacturing from those who were interested in the work. The files of the AMERICAN JOURNAL OF PHARMACY reveal many cuts and drawings which were used to illustrate his numerous pharmaceutical papers, which he freely furnished to his friend, Prof. William Procter, the former editor of this publication.

We find by consulting this JOURNAL that his first paper was published in 1855, and was entitled "Preparation of Citrate of Iron and Quinine and its Constituents." After this appeared the following:

1855. Examination of the Sulphate of Quinine of Powers & Weightman.

1856. Elementary Analysis of Sperm Oil.
On Spiritus Aetheris Nitrosi.
Apparatus for Preparing Ether by Steam Heat.
Improved Method for Carbon and Hydrogen Determination in Organic Analysis.

1857. Examination of Grain Weights.
Extractum Colocynthidis Compositum.
Oleum Aethereum and Spiritus Aetheris Compositus.
On Tinctura Ferri Chloridi.
On Hydrargyrum cum Creta and Pilulæ Hydrargyri.
On the Manufacture, Impurities and Tests of Chloroform.

1858. On the Purification of Liquids in a State of Vapor.
On a New Apparatus for Rectifying Spirits.
On the Process of Percolation.

1859. On the Revision of the U. S. Pharmacopœia.

1860. On Opium as a Therapeutic Agent.
Observations upon Some Formulæ and Processes that may be Brought Forward for Admission into the Next Pharmacopœia.

1861. On Oleum Aethereum.

1863. On Statistics and Assay of Virgin Scammony.
On Extractum Cinchonæ Fluidum.

1864. On Permanganate of Potassa.

1866. Economy of Alcohol in Percolation in Making the Fluid Extracts.
Advice on Epidemic Cholera.

1867. Letter Relative to Alcoholic Extract of Colocynth.
On an Improved Formula for Fluid Extract of Buchu.
Pharmacy of the Cinchonas.
Calx Saccharatum and Syrupus Calcis.

1868. On the Economy of Alcohol in Percolation.
On the Preparation of Resin of Podophyllum.
On Podophyllum Pills.
On Commercial Jalap.
Syrupus Ferri Iodidi.
On Syrupus Calcis.

1869. On Carbolic Acid or Coal Tar Creosote.
On the Contamination of Hydrochloric Acid with Oxides of Sulphur.

1870. On Liquor Opii Compositus.

1872. Note on Pareira.

1878. Fluid Extracts by Repercolation.
Hydrobromic Acid.

1879. Minim Pipettes.

1882. Opium Assay.

1884. Aconite Root.

1887. Cascara Sagrada.

1888. Notes on Antipyretics.

1890. Pharmacopœial Revision and Assays.

1895. Improvement in the Manufacture of Acetone.

1896. Acetone and Acetone Chloroform.

1898. Acetic Acid as a Menstruum.

1899. Acetic Acid as a Substitute for Ethyl Alcohol in the Extraction of Drugs. First and Second Papers.

1900. Acetic Acid as a Substitute for Ethyl Alcohol in the Extraction of Drugs. Third and Fourth Papers.

He joined the American Pharmaceutical Association in 1858, becoming a life member in 1900. He received the unusual compliment of being made Vice-President at the first meeting at which he was elected a member. The proceedings of the Association contain many papers of great practical and scientific value emanating from his pen. It is hardly necessary to say that he was many times asked to accept the presidency, which he always politely declined.

The papers which he contributed to the American Pharmaceutical Association were as follows:

1858. On Preparations of the Pharmacopœia.
1860. On Oleum Aethereum.
Remarks on the Sale of Poisons.
Remarks on the Subject of Alcohol.
1861. On Virgin Scammony.
On Bleaching Morphine Sulphate.
1862. On Amendments to Processes of the Pharmacopœia.
Preparations of Metallic Mercury.
1863. Report on Drug Market.
1865. Economy of Alcohol in Repercolation.
Remarks on Revenue Law.
Remarks on Vacuum Apparatus.
On Press Cloths.
1866. Improved Process for Fluid Extract of Buchu.
Report on the Internal Revenue Law.
1867. Commercial Jalap.
Repercolation.
1868. Contamination of Hydrochloric Acid with Oxides of Sulphur.
Hydrocyanic Acid.
Note on Carbolic Acid.
Note on Rhubarb.
Specimens of Indigenous Drugs.
1869. Note on Rhubarb.
Report on Pharmacopœia.
1870. Fluid Extracts and their Menstruum.
Note on Rhubarb.
Remarks on Chloral.
Aconite Poisoning.
1871. Cantharides and a Blistering Liquid.
Chloral.
Commercial Bicarbonate of Soda.
Extract of Jalap.
Fluid Extract of Senega.
Litmus Paper.
Pareira.
Rhubarb.
1872. Citrate of Bismuth and Ammonia.
New Form of Percolation.

Note on Aconite Root.
Note on Aloes.
Note on Rhubarb.
Note on Triplex Pills.
Acid Phosphoric Glacial.

1873. Bumping of Distilled Spirits.
Ergot and its Preparations.
General Apparatus Stand.
Note on Rhubarb.
Physicians' Pocket Cases.

1876. Administration of Phosphorus.
Revision of the Pharmacopœia.

1877. Salicylic Acid.

1878. Fluid Extracts by Repercolation.

On January 1, 1882, Dr. Squibb commenced the publication of a pharmaceutical journal which he called *An Ephemeris*. The announcement, which he wrote (see page 1 of the journal), is so thoroughly characteristic that the following abstracts are here quoted: "It will be sent gratuitously to all. No subscribers are solicited, nor any subscription list kept, nor are exchanges with other journals asked for. It may be issued bi-monthly or quarterly, or irregularly, or not at all, as the occupations of a very busy life may determine. The contents should be accepted, if at all, as information—not as knowledge. To the professions of Medicine and Pharmacy then, whatever may be here offered is respectfully dedicated by the writer and his two sons."

The publication of the *Ephemeris* afforded Dr. Squibb and his sons an outlet for the dissemination of a vast deal of information which came to them in the course of their business and professional lives. Five volumes had appeared up to the time of his death, and 2551 pages, and the journal has always proved a most welcome visitor to the members of both professions.

Dr. Squibb possessed in a remarkable degree, the faculty of imparting information. It may be said that he always took delight in explaining in detail the working of an apparatus, a process, a theory, or in fact, anything which had been to him a subject of thought or labor. Many of his papers have seemed to thoughtless or uninterested readers to be prolix or verbose, but his large experience had taught him the value of detail in his business. He had spent

thousands of dollars in devising apparatus, only to find that some important detail had been omitted, and time had been lost and money wasted until the defect was remedied, and if the careless reader had realized these facts, criticism would certainly have been withheld.

Sterling honesty, and right because it was right, were his guiding principles. If an error occurred in making a preparation in the laboratory, the standing rule was to report it at once. The writer well remembers an occasion when some mistake was made in the menstruum for a lot of fluid extract of cinchona. It contained possibly 10 per cent. too much or too little alcohol. The culprit, a most worthy German pharmacist, appeared before the doctor and confessed his sin. Without a moment's hesitation the doctor said, "That's too bad, that's too bad; empty it all down the culvert;" and fully $500 worth of fluid extract of cinchona found its way into the East River.

The writer had the hardihood to ask the doctor, a week after the occurrence, why this had been done. The answer has never been forgotten. He admitted that it would be possible to make an equal lot of fluid extract of cinchona with the menstruum so altered that when the two were mixed the result would have the proper alcoholic strength; he turned almost fiercely and said, "Such work can never be done in this laboratory. These mistakes are costly, but the example and lessons to be learned are valuable, and I will not permit a patched up fluid extract to leave this place." He never referred again to the incident, but it may well be said that mistakes of that kind were never made again.

When the College of Pharmacy of the City of New York was younger and lacked the financial support it has since secured, Dr. Squibb gave it his services as a teacher without remuneration. This was in 1869-71, when the faculty consisted of Professor Chandler, Professor of Physics and Chemistry; Dr. Squibb, Professor of Pharmacy, and Dr. Day, Professor of Botany and Materia Medica. At a meeting of the college, held in October, 1900, it was resolved to present an engrossed testimonial to Dr. Squibb, the occasion of this token of appreciation, being the rounding out by the Doctor of his four score years.

He was a member of the American Medical Association, the New York State Medical Association, the Kings County Medical Asso-

ciation, and a life member of the New York Society for the Relief of Widows and Orphans of Medical Men. He was elected an honorary member of the British Pharmaceutical Conference in October, 1872, and an honorary member of the Pharmaceutical Society of Great Britain on May 1, 1878. The degree of Master in Pharmacy was conferred on him February 6, 1894, by the Philadelphia College of Pharmacy. He was elected a member of the American Chemical Society on March 3, 1877. He was a resident member of the Linnean Society in New York, a life member and Fellow of the Brooklyn Institute of Arts and Sciences, a Fellow of the American Association for the Advancement of Science, and a member of the American Philosophical Society of Philadelphia.

Dr. Squibb took a most active part in the development and improvement of the United States Pharmacopœia since the 1860 Revision. He was a member of the committee at that time, but in subsequent revisions he declined membership in the committee, but, nevertheless, rendered most valuable service until almost the day of his death.

An incident in connection with Pharmacopœia revision in 1860 was told the writer by Professor Procter, and it is reproduced because it is characteristic of the man. The meetings of the Committee were held periodically in Philadelphia, and Dr. Squibb came over from New York and spent the day in the Quaker City with his friend Procter. The meetings were held at Dr. George B. Wood's residence. The subject under discussion on one occasion was aloes, Dr. Squibb stating that the commercial aloes which came to this market was filled with mechanical impurities of all sorts—sticks, stones, earth, goatskins, bits of iron and lead, etc., etc. Dr. Wood, Professor Procter, Alfred B. Taylor, and other members of the committee thought that Dr. Squibb was exaggerating, and one of them said playfully, that New York aloes might have all of those impurities in it, but he did not believe that the aloes imported into Philadelphia was of that character. Thus challenged, Dr. Squibb promptly asked Professor Procter to buy the best cask of aloes he could get in Philadelphia, on his account, ship it to New York, and he would melt and soften the aloes, adding alcohol and water, strain it, weigh the impurities, ascertain the percentage, and send to the committee the record with the package containing the debris, accompanied by a sample of the purified product.

The result was profoundly surprising to the committee. It showed conclusively that there was not an original package of aloes brought into the country which was not loaded up with gross impurities. The committee acknowledged the result of the doctor's work, and Aloe Purificata has been retained in every revision of the Pharmacopœia since.

In reviewing the life of Dr. Squibb, one cannot help being impressed with his striking individuality. He never forgot or minimized the importance of his mission. He consecrated his life to the object of furnishing honest medicines for the relief of disease, and naturally his laboratory work had the first place; morning, noon, and night found him there. Habits of order and cleanliness he instilled in all who were under his guidance or instruction. He hated a lie, even a little one, and he was always the soul of honor. To many he appeared to be stern; it was true he was never yielding or weak. One could almost say in advance just where to place Dr. Squibb upon any question. He delighted in original investigation and chemical research if they had any bearing upon making medicines. Abstract subjects he took little interest in, although he was fond of arguing upon such subjects, but he would not waste time upon anything which he did not believe productive of results of immediate practical value to mankind.

His standards of purity for pharmaceutical products were the highest attainable, and he believed that if he was to work long enough and hard enough, keeping his eye single to this one object, the time would come when his labors would be recognized, and it can safely be said that he lived to see the time when they were not only appreciated by his fellows, but substantially rewarded.

His liberality in giving aid to all who were in sympathy with his life purposes was shown at all times. He never hesitated to share with others the benefits of his great ingenuity and wide experience, but probably his greatest influence in the advancement of chemical science lay in the encouragement and assistance which he gave to young men, so that his services to the profession were far reaching, not only on account of the enormous volume of work which he himself accomplished, but also because he enabled others to do much.

In the latter part of his life, a number of years were spent in foreign travel, in Europe and the Orient, Russia, Norway and

Sweden, Germany—in fact, there was scarcely a country which he had not visited.

He died early in the evening of October 25, 1900, at his home, 152 Columbia Heights, Brooklyn, after only a few hours' confinement to his room; his suffering was mainly due to difficulty in breathing. The immediate cause of his death was cardiac dyspnœa, due to occlusion of the coronary artery.

Dr. Squibb enjoyed excellent health during the greater part of his life. He took regular exercise in his gymnasium until his eyesight failed, and he was thus incapacitated. He bore suffering stoically. He was very punctual in his habits, keeping his engagements conscientiously, and followed a regular plan, with fixed times for performing his duties, and his industry was amazing. He had a natural taste for art and was an excellent judge of painting, of which he was especially fond. Without being luxurious in his tastes, and knowing the value of works of art, he enjoyed the possession of the rare and beautiful objects, which denotes a cultured and refined mind. He married, on October 7, 1852, Caroline Lownds Cook, daughter of Elisha Worth Cook and Lois Crowell Cook, of Philadelphia. His widow and the following three children survive him: Edward Hamilton Squibb, M.D.; Charles Fellows Squibb and Mrs. John Munro (Mary King Squibb). The sons were graduated from Harvard University, and both have succeeded to the business founded by their father.

American Pharmacy lost one of its greatest exponents and its sturdiest figure when the summons came by the grim messenger, to a higher life. Eighty years were vouchsafed to him, and he was honest, not from policy, but because it hurt him sorely to be otherwise, and surrounded as he was by those who sought temporary advantage by questionable business practices, trickery or even doubtful methods, his life work was carried on in the face of active warfare. It would be impossible for any one to meet him and then forget him; he stamped his personality indelibly on one's memory. He was a leader among leaders.

He might wound the feelings of some by the frank, outspoken condemnation of what he believed to be wrong, but it was the sin and not the sinner that he denounced. It would be impossible for him to yield to any course of doubtful morality. He often stood alone and would make no effort to win others to his views when

they were founded on principle and the *rock of truth* itself. In non-essentials he would often yield because he knew that the great principles for which he contended, would be all the stronger if he did not degenerate into a mere pessimist or chronic objector. He loved to quote when standing alone, bereft of the support of his friends on some important question, the famous words of the orator, "*God and one are a majority.*"

THE INTERNATIONAL PHARMACEUTICAL CONGRESSES.

By Dr. Fr. Hoffmann.

(*Concluded from p. 383.*)

A FURTHER MOVE TO HAVE THE CONGRESS MEET IN THE UNITED STATES.

The choice of Milan as the place for convening the seventh meeting of the International Pharmaceutical Congress had been made without a preceding invitation by, or inquiry at, Italian pharmaceutical associations. The choice, however, was politely accepted by them and a general committee on organization formed consisting of Professors *Cannizzaro*, of Rome, *Vitali*, of Milan, *Dr. Pessina*, of Milan, and Messrs. *Castoldi* and *Venturini*, of Milan. This committee, as well as that of the Pharmaceutical Societies of Lombardy, made strenuous efforts for a creditable and successful consummation of the duty imposed upon them. Invitations were sent out, but again repealed and the time of meeting postponed for another year. In 1889 a new law affecting the admission to, and the exercise of, the practice of pharmacy had been promulgated in Italy and engaged the interest and anxiety of the pharmacists to such an extent that they felt little disposition to diverge their attention and concern to outside affairs. In consequence the committees formed failed to meet with the requisite encouragement and support by both the authorities and the pharmacists.

In 1889 the committee by a circular letter again postponed the meeting to 1891 on account of the International Exposition taking place in Paris in 1889. In this circular a remarkable departure occurred both in the matter of the objects and in the choice of the participants of the congress. As entitled to admittance the follow-

ing were designated: Professors of universities, polytechnic schools and colleges, professors of physical and natural sciences of any school, pharmacists and chemists delegated by pharmaceutical associations or by sanitary boards, members of such boards, assistants of institutes, laboratories or museums devoted to physical and natural sciences, medicine or pharmacy, chemists, directors and assistants of municipal laboratories, proprietors and directors of all laboratories for public service, proprietors and directors of chemical industrial establishments and chemists employed in such.

As stated on pages 324 and 379 the *American Pharmaceutical Association* had twice extended an invitation to the congress to meet in the United States, in 1874 and in 1881. At this juncture of delay and uncertainty, and in consideration of the prospective World's Fair in Chicago in 1893, the association passed at its meeting in Old Point Comfort in Virginia, September 12, 1890, the resolution "that it would be desirable that the International Pharmaceutical Congress meet in Chicago in 1893, that a hearty invitation be extended to the pharmacists of all countries to be present at the meeting of this association in 1893; and that a committee be appointed to report upon the matter at a future meeting."

At the next meeting of the association, in New Orleans in April, 1891, the following local committee to co-operate with the World's Fair Auxiliary in the work of preparing for an International Pharmaceutical Congress was elected: Messrs. *O. Oldberg*, *E. H. Sargent*, *A. E. Ebert*, *D. R. Dyche*, *C. S. N. Hallberg*, all in Chicago.

Very likely in consequence of the action of the American Pharmaceutical Association in its meetings in 1890 and 1891 the following circular letter was issued on May 15, 1891:

The directors and proprietors of Italian pharmacies, especially those of the northern provinces of the Kingdom, perturbed by the changes of the material conditions of pharmacy, brought about by a new law of December 22, 1888, for the protection of public hygiene and sanitation, and by legal contests with the authorities over the new and stringent exactments, have not been able to co-operate towards the success of the Pharmaceutical Congress in Milan, to the extent they promised before the new law went into effect.

Notwithstanding these difficulties, the Committee on Organization would have persevered in its efforts, had it not been for the very discouragingly small number of adherences received, every hope of success being thus cut off. Despite the announcements and invitations made in the principal Italian and foreign periodicals, and the 25,000 circulars forwarded, the committee received scarcely thirty assents.

The committee, therefore, resolved to postpone the convocation of the Congress to a more opportune time.

[Signed]

Cannizzarro, Vitali, Pessina, Castoldi, Venturini.

Hereupon and perhaps being unaware of the previous efforts made for having the Congress meet in the United States of America, the general secretary of the Parisian pharmaceutical societies, Mr. H. *Bocquillon-Limousin*, addressed, July 1, 1891, a circular letter to the presidents of the various pharmaceutical societies, asking for opinions and advice as to the desirability of a speedy meeting of the Congress for the consideration of those questions which affect the immediate interests and prosperity of the pharmacists, and of completing the work initiated by previous congresses. In the event of approval, Madrid or Prague were suggested as convenient places for holding the meeting.

To this communication the following response was returned from the United States of America:

The undersigned beg to acknowledge the receipt of your circular letter of July 1, 1891, and to state in reply thereto, that by a resolution passed at the meeting in September, 1890, the *American Pharmaceutical Association* has expressed itself in favor of holding the next International Pharmaceutical Congress in 1893, in the city of *Chicago*, during the time of the Columbian Exposition.

This resolution has been communicated to Mr. *Van de Vyvere*, Secretary-General of the Sixth International Pharmaceutical Congress, and to Professor *Cannizzarro*, President of the Committee on Organization for the seventh congress.

At a meeting held May 1, 1891, the American Pharmaceutical Association appointed a committee for perfecting the arrangements for the contemplated pharmaceutical congress at Chicago, and invitations will be issued at an early date. We beg you to use your influence and that of your Society in favor of holding the next International Pharmaceutical Congress in Chicago, in the year 1893.

[Signed] A. K. Finlay,
President.
John M. Maisch,
Secretary.

New Orleans and Philadelphia, September 5, 1891.

To this communication the following reply was received by the President of the American Pharmaceutical Association:

We have duly received your letter, in which you communicate to us the resolution passed by the American Pharmaceutical Association, inviting the pharmacists of all countries to a congress which is to meet in Chicago, in 1893.

Since we do not know whether the Italian committee will convene the Seventh International Congress, we have confirmed to the same your decision, and have requested the committee, in case the pharmacists are not to be convened at Milan, to cede to you the powers received from the International Congress of 1885.

[Signed] D. A. VAN BASTELAER,
President.
E. VAN DE VYVERE,
General Secretary.

BRUSSELS, November 26, 1891.

Early in 1893, the presiding officers of the American Pharmaceutical Association, and the local committee on the Seventh International Pharmaceutical Congress appointed by the Association, issued separately the following circular letters of invitation in three languages, to the pharmaceutical societies and other organized bodies of pharmacists, as well as to the pharmacists of all countries.

PHILADELPHIA, March 30, 1893.

The *American Pharmaceutical Association* had extended an invitation to the Third International Pharmaceutical Congress, held at St. Petersburg, in 1874, to call the Fourth Congress in Philadelphia, in 1876, during the Centennial Exposition; but the selection of a city in the United States was deemed unadvisable at that time.

After it had been decided that the World's Columbian Exposition should be held in the city of Chicago in 1893, the American Pharmaceutical Association again invited the pharmaceutical congress to meet in this country. The Italian Committee on Organization having, by circular of May 15, 1891, and for reasons stated therein, renounced the convocation of the Seventh International Pharmaceutical Congress at Milan; the Executive Committee of the Sixth Congress, at Brussels, by letter of November 26, 1891, confirmed the invitation of the American Pharmaceutical Association, and in a communication of February 16, 1892, the former Committee on Organization at Milan, expressed the view that there was nothing, under the circumstances stated, to prevent the organization of the Seventh International Pharmaceutical Congress in 1893, in Chicago.

Now, in view of the above facts, the undersigned officers of the American Pharmaceutical Association take pleasure in extending a hearty invitation to the pharmaceutical societies of all countries to appoint delegates to the International Pharmaceutical Congress, which is to assemble in the city of Chicago during the year 1893, and in which teachers to pharmaceutical institutions and pharmacists in general are likewise cordially invited to participate.

It is especially desired, that the contents of this circular letter be brought to the notice of kindred societies, and that information be given to the undersigned secretary, relating to suggestions of subjects of general importance, suitable for discussion and action by the Congress, as well as to the intention of pharmaceutical societies, of teachers of pharmacy and pharmacists in other countries, of being present or represented at the Congress of 1893.

"Further steps for promoting the objects and deciding upon the date of the congress will be taken at the meeting of the American Pharmaceutical Association at the meeting in July of the present year. Meanwhile, the undersigned desire to assure all who may come as delegates, as members or as visitors, to the International Pharmaceutical Congress, at Chicago, in 1893, of the very cordial reception on behalf of the Pharmacists of the United States of America.

[Signed] ALEX. K. FINLAY,
President of the American Pharm. Association.
JOHN M. MAISCH,
Permanent Secretary.

CHICAGO, May 26, 1892.

The *American Pharmaceutical Association* has invited the Seventh International Pharmaceutical Congress to meet in the city of Chicago during the season of the World's Columbian Exposition, in 1893; the assent of the Executive Committee of the Sixth Congress at Brussels, and its Committee on Organization at Milan, has been formally given, and the American Pharmaceutical Association has appointed a special committee to arrange the preliminaries.

In the performance of its function, this committee has the honor, therefore, to invite all pharmaceutical societies and other organized bodies of all countries to appoint delegates to the Seventh International Pharmaceutical Congress, to be held in Chicago in 1893; and an invitation is also extended to all teachers in pharmaceutical schools and members of pharmacopœial commissions to participate in the congress.

The precedents established by previous International Pharmaceutical Congresses will be followed in regard to all preliminaries as far as practicable.

On behalf of the American Pharmaceutical Association, all who will honor the occasion by their presence are assured of a most hearty welcome.

By the committee:

[Signed] OSCAR OLDBERG,
Chairman.
ALBERT E. EBERT,
Secretary.

These letters of invitation were accompanied by a preliminary announcement and programme, containing among others the following items:

"The general scope and object of the International Pharmaceutical Congress will be to stimulate pharmaceutical progress, to discuss the status of pharmacists and promote an intelligent appreciation of the work they do, and to consider matters and measures affecting the further advancement of pharmacy and a nearer approach to international agreement in education and practice.

"The subjects to be considered by the congress will be classified into the following four sections: (1) Historical and ethical pharmacy; (2) pharmaceutical education and legislation; (3) pharmacopœial matters; (4) general questions pertaining to pharmacy and not assignable to any of the three preceding sections.

"The congress will be constituted of delegates accredited by the governments of the various countries, of the pharmaceutical societies, of examining boards,

of colleges of pharmacy, of pharmaceutical departments of universities, and of national pharmacopœial commissions. It is proposed that each of these bodies should be represented by three delegates.

"The proceedings of the congress shall be in the English language and interpreters shall be employed for the benefit of German, French and Spanish visitors for translating letters, papers, etc.

SEVENTH CONGRESS IN CHICAGO, 1893.

The congress assembled in first session, August 21, 1893. Great Britain, Canada, Nova Scotia, Holland, Belgium, Austria, Sweden, Norway, Costa Rica, the Bermudas and Australasia were represented by twenty delegates, the United States by 114. Not represented were Germany, France, Russia, Italy, Spain, Portugal, Denmark.

The meeting was opened with addresses by the Chairman of the Local Committee, Professor *Oldberg*, of Chicago; Mr. *Carteighe*, President of the Pharmaceutical Society of Great Britain, and Professor *Patch*, President of the American Pharmaceutical Association. The nomination of officers resulted in the election of Prof. *Joseph P. Remington*, of Philadelphia, as President, and of fifteen vice-presidents and four secretaries.

The main interest of pharmaceutical gatherings in Chicago in the month of August, 1893, had been exhausted by the meetings of the American Pharmaceutical Association immediately preceding the International Congress, which was little more than a supplementary function to the meeting of the National Association. Its proceedings fell far short of adequately dealing with the imposing array of subjects drawn up under four sectional divisions.

The first question considered was: What progress has been made toward the preparation of an international pharmacopœia for potent remedies?—The few who participated in the discussion agreed in the opinion that an international pharmacopœia including all important pharmaceutical remedies and suitable to all countries would be impracticable, whilst an international conspectus of potent remedies, as a standard for the various national pharmacopœias, would be attainable, so as to approach in the course of new revisions of the same to greater uniformity of the composition and strength of galenical preparations containing potent drugs. As a result of the brief discussions the following resolutions were adopted:

That a commission be empowered by this congress to compile and publish an international pharmacopœia; that this commission consist of one represen-

tative from each of the countries represented in this congress, and from other countries as may hereafter be determined.

That a committee of five, of whom the President of this congress shall be chairman, be now chosen, and that said committee shall decide what other countries besides those here represented shall be invited to join in the work. The committee shall also determine how the members of the commission shall be appointed.

That this congress accept, with thanks, the proffer of the American Pharmaceutical Association of the sum of $1,000 to help in defraying the expenses of compiling, publishing and distributing an international pharmacopœia.

The drafts heretofore offered and accepted at the congresses at St. Petersburg (page 374), and at Brussels (page 381), had failed of realization.

As a nucleus of an international pharmacopœia commission, Messrs. *Remington*, of the United States of America, *Carteighe*, of Great Britain, and *von Waldheim*, of Austria, were proposed and elected as members.

The second question discussed referred to pharmaceutical education and examination, and to a compulsory curriculum. Notwithstanding the great divergences of opinion and usages prevailing in the various countries, the following resolutions were finally agreed upon:

"No person should be admitted as an apprentice in pharmacy unless he shall have given evidence, by satisfactory passing a preliminary examination, that he possesses a general education sufficient for that purpose, and as advanced as the conditions of the practice of pharmacy in each country may permit, and this term of apprenticeship in pharmacy should in no case be counted so far as it may antedate such evidence of sufficient preliminary education.

"The compulsory period of apprenticeship should be no less than four years, including the time devoted by the apprentice to regular attendance upon a course of instruction in a college or school of pharmacy.

"Recognizing the inadequacy of examinations as a means of determining the qualifications of persons seeking the important privilege of dispensing and compounding medicines, this Congress approves of the establishment of a compulsory curriculum of pharmaceutical education, and holds that no person should be regarded as a qualified pharmacist who has not pursued to completion a systematic course of instruction in the various branches of pharmaceutical sciences, and delegates in this Congress are requested to lend their aid toward securing the recognition of a principle of so much fundamental importance to pharmacy."

The third and final question from the comprehensive array of the programme was the relation of the pharmacist to public sanitation, particularly in the matter of the adulteration of food. After brief

discussion the following resolution was offered by a committee of five and adopted :

"That, in the judgment of this Congress, the educated pharmacist is a natural and proper expert on measures for public health, not only in prevention of food adulteration, but in the inspection of water supplies, the enforcement of good sewerage, etc. The pharmacist, by virtue of his profession, is the common chemist to the common people."

The President of the Congress called attention to one important subject of the programme, namely, the influence exerted upon the practice of pharmacy by the introduction of chemicals and other medicinal substances controlled or limited by patents, copyrights, trademarks or other legal restrictions.

Should such limitations as foster monopoly in the manufacture and sale of such medicinally used products be removed in the interest of the public good ?—The fact was, as shown by Mr. *Wm. Bodemann*, of Chicago, at the preceding meeting of the American Pharmaceutical Association, that the price of most synthetic products imported into the United States is very largely out of proportion to their cost of production and real value.

No action, however, was taken upon this subject, nor was the perennial topic of specialties and nostrums entered upon, likely as being a rather delicate object in a country where this much-abused form of medication has attained to such a dominant position.[1]

At the second session of the Congress the Hanbury gold medal for distinguished services in the domain of pharmacognosy was presented by the President of the Pharmaceutical Society of Great Britain, Mr. *Michael Carteighe*, of London, to Prof. *John M. Maisch*, who, on account of serious illness, was unable to attend the meetings in Chicago. Professor *Remington* responded in correspondly graceful words to the generous presentation, and accepted the medal with thanks and appreciation to deliver the same to the recipient.

At the conclusion of the meetings an executive committee of the

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[1] At its stated meeting in the Profile House, July, 1892, the American Pharmaceutical Association had unequivocally expressed its censure on nostrums by the adoption of the following resolution : "That the American Pharmaceutical Association desires to record its appreciation of the ethical position taken by the American Medical Association at its last meeting in its efforts to discourage the use of secret remedies and the traffic in nostrums."

Seventh International Pharmaceutical Congress was appointed, consisting of the President and acting Secretary of the Congress, Professors *Remington*, of Philadelphia, *Oldberg*, of Chicago, and Messrs. *Carteighe*, of London, *Ramlot*, of Brussels, and Professor *A. B. Prescott*, of Michigan. This committee was authorized in due time to provide for the assembling of the next Congress in such a manner as they might deem appropriate, and to represent the Seventh Congress until its successor shall have been convened.

EIGHTH CONGRESS IN BRUSSELS, 1897.

Upon the invitation of the Belgian General Pharmaceutical Association the Eighth International Pharmaceutical Congress met for a second time in Brussels in August, 1897. The meetings were well attended, mostly by Belgian pharmacists. The number of foreign delegates and visitors was a comparatively small one. They came from France, Holland, Great Britain, Italy, Sweden, Bulgaria, Mexico, Russia and the United States (Professor *Remington*, Philadelphia, Mr. *Meyer*, New Orleans). No pharmaceutical societies from Germany, Austria, Russia, Switzerland, Great Britain, etc., were represented by delegates.

Like the first Congress in Brussels, in 1885, this one was also patronized by the Government and the Secretary of Public Health welcomed the Congress at its opening session in a brief address. Professor *Ranwez* of the University of Louvain, acted as president and Mr. *Duyck*, of Brussels, as general secretary.

The deliberations were conducted in the French language and in these six sections:

(1) Legislation and professional interests; (2) Practical pharmacy, chemistry, pharmacognosy; (3) Examination of food; (4) Hygiene; (5) Bacteriology; (6) Toxicology.

As main questions for deliberation were proposed in the programme the following ones:

(1) Is it desirable in consideration of the present state of knowledge to establish a definite standard of strength in active constituents of drugs and the pharmaceutical preparations made therefrom?

(2) Is it necessary to establish uniform methods for the quantitative estimation of the active principles of drugs and preparations made therefrom?

(3) In what way is the practice of pharmacy to be best regulated in the interest and for the safety of the public?

(4) How can the manufacture and trade in the newer remedies be best regu-

lated? Is is compatible with the public interest to protect such remedies by patent rights and trademarks?

(5) Can the manufacture and the dispensation of organo-therapeutic preparations be retained in the hands of the pharmacist? In what way can the quality of these products be controlled and guaranteed?

(6) What methods are the best for bacteriological investigations of potable waters? Are the present methods sufficiently reliable?

The chairman, Professor *Ranwez*, opened the Congress, August 14, 1897, by a brief review of the history of the general Pharmaceutical Society of Belgium, just celebrating its fiftieth anniversary, and introduced the discussion on the first two questions, stating that they had occupied the consideration of the preceding congresses as well as that of Applied Chemistry held at Paris in 1896. The various speakers agreed in the desirability of attaining to uniform methods of the standardization of potent drugs and chemicals. It was, however, admitted that by the adoption of a strict dosimetric and pharmaco-dynamic system the pharmacist might be reduced to a mere dispenser of ready-made factory products. Attention was also called to the fact that in a number of important drugs it was not the principal alkaloids or glycosides that constitute their therapeutical value, but the total amount of active principles contained therein, as also that not a few vegetable drugs were subjected to prevailing variations in climate, soil, moisture, their handling in preparation for the market, and that there were cases of exemption from general rules and principles in standardization.

Ultimately the recommendation was adopted "that the respective authorities should require a uniform percentage of active important principles in medicinal preparations."

Question 3 was briefly discussed, particularly in regard to the practice of pharmacy by physicians and other unqualified persons associated with proprietors of pharmacies.

The limitation of the number of pharmacies in proportion to the population was considered by most speakers as unnecessary for the interest of the public and the pharmacist, provided that there is adequate provision for proper education and qualification. Under these conditions limitation was held by most speakers to be a retrograde step in every respect.

A brief discussion on pharmaceutical education and examination added nothing new to the deliberations on this subject by the previous congresses.

The perennial question of an international pharmacopœia seemed to have lost much in interest. Professor *Remington* read a paper on the relations between pharmacists and physicians in connection with pharmacopœial revisions; he advocated the principle of differentiating the domain of the practitioner of pharmacy and that of the practitioner of medicine as being an efficient means of promoting the interests of pharmacy and the mutual relations of the pharmacist and physician in their professional bearings as well as in the work of the revision of the pharmacopœia.

Professor *Remington* also read a brief report as chairman of a standing committee of three appointed at the Congress meeting in Chicago in 1893, consisting of Messrs. *Remington*, of Philadelphia; *Carteighe*, of London, and *Waldheim*, of Vienna, stating that in consequence of the illness of the latter, and the great difficulties in corresponding with associations and authorities in distant countries, little progress had been made.

The suggestion made prevailed "that it might be a subservient step towards attaining to a greater uniformity in the pharmacopœial formulæ to have an international committee of prominent pharmacists as an advisory body for co-operation with the committees of pharmacopœial revision in the various countries; and that in any such work a larger representation of practical pharmacists and teachers of pharmaceutical branches was desirable.

Questions 4, 5 and 6 were only briefly discussed as somewhat irrelevant and of less interest and consequence. In regard to organo-therapeutic remedies it was considered as impracticable to establish definite rules inasmuch as their active principles as yet are insufficiently known and as their therapeutic action can only be estimated by physiological tests and much less by analytical examination.

In regard to the newer remedies the following resolutions offered by Mr. *Hayn*, of Antwerp, were adopted:

(1) That the distinctive properties and reactions of each new remedy should be published on the label and in all circulars relating to the remedy.

(2) That central laboratories be established for the analysis and control of new remedies.

(3) A standing committee for the study and examination of all new medicinal products should be established, the members of which should be appointed by the different governments from the members of the academies of medicine or of pharmacopœia committees.

(4) There should be an official control and verification of serums and the various glandular juices, etc.

(5) The nomenclature of new remedies should be revised and controlled in order to avoid duplicity or confusion of names and errors.

(6) The pharmacopœias of every country should be provided with an annual supplement.

In regard to the question of nostrums the resolution was adopted that national and local pharmaceutical associations should co-operate with the medical societies, with the object of suppressing quackery and the use of nostrums.

The question on specialties was again discussed with the customary animation and dissension. Finally the resolution prevailed, "that in all countries laws should be inaugurated that all specialties should publish on their labels and in circulars the active constituents they contain and the average dose."

In conclusion the city of Paris was selected for holding the next Congress in 1900.

NINTH CONGRESS IN PARIS, 1900.

The Ninth International Pharmaceutical Congress was the second meeting of these conferences in Paris and at the time of an International Exposition, as also of a series of other international congresses.

The programme sent out with circular letters of invitation by the French local committee deviated still more from the preceding ones and contained quite an array of miscellaneous questions grouped into four sections. These were: (1) Pharmacy and pharmaceutical chemistry; (2) Materia medica and pharmacognosy; (3) Biological chemistry, bacteriology, hygiene and hydrology; (4) Professional interests. A number of communications and papers printed in advance was received and referred to the respective sections. Each section held separate sessions.

The Congress convened in Paris, August 2, 1900. The majority of visitors were Frenchmen; no special differentiation was made between delegates and visitors. Authorized delegates from foreign pharmaceutical associations were present from the following countries: Belgium, ten; Germany, five; Austria, two; Switzerland, three; Roumania, two; Russia, one; Mexico, one; Sweden and Norway, three; Denmark, two; Italy, three; Greece, one; Spain, two, and Holland, two. Officially not represented were Great Britain and the United States of America. No government was officially represented.

The inaugural meeting took place in one of the halls of the Paris School of Pharmacy on August 2d. President *Petit* being in the chair, and Mr. *Cronin* acting as secretary.

The first subject brought to discussion was the chronic question of an international pharmacopœia. Prof. *A. Tschirch*, of Berne, stated that all efforts ventured upon by any one of the preceding congresses had utterly failed in producing an international pharmacopœia or agreement for a uniform strength of potent remedial preparations, because only a limited number of countries was represented at the meetings, the propositions made were only fragmentary and not sufficiently studied beforehand, nor were the delegates in possession of official instructions from their governments. Therefore, every draft for an international pharmacopœia had been shelved with the resolutions passed and the meetings closed. He, therefore, suggested that this congress should send to the Belgian Government, which had the matter in hand, a communication containing the following proposition:

"That the governments of the countries most interested should each appoint at least two official delegates, and that the minor States should also send representatives. That the programme should be drawn up in detail, and studied by the delegates before the meeting of the congress, and that the fundamental principles of the programme should be communicated to the governing medical corporations of the countries represented, with the request that they should be considered and reported on. In addition to the official delegates representing the States, the principal academies of medicine and pharmaceutical societies should be asked to send delegates." After quite a discussion on these propositions a committee consisting of nine delegates was appointed to consider the matter and to report at a later session of the congress. At the fourth session this committee proposed the adoption of the following recommendation:

"To have a comparative table prepared showing the differences in strength of medicaments bearing the same name in different pharmacopœias. To have this table distributed to the pharmacopœia commissions, to the academies of medicine and the pharmaceutical colleges and associations of the various countries with the request to take this matter into due consideration at their next pharmacopœia revision, and to adopt as much as possible a uniform standard of strength, and where differences still remain, to call attention to such in footnotes.

"To ask the Belgian Government to arrange with other governments a conference in Brussels, and to ask all the delegates appointed to such a conference to have their proposals ready to lay before the meeting whenever this may be called."

The next question discussed was the unification of assay processes with reference to the standardization of potent drugs and their pharmaceutical preparations, particularly such as contain alkaloids, glycosides and other definite principles capable of isolation and determination. This subject had been referred to this congress by the preceding one in Brussels in 1897; but nothing had been reported by the respective committee, leaving the matter just as it stood before. It was, however, properly suggested that this question would be settled with the appearance of an international pharmacopœia, and perhaps in advance by national pharmacopœias in course of their revision and publication.

Quite a number of papers were read or reports made on a variety of subject-matters relating to materia medica, to analytical and assay methods, to the practice of pharmacy, etc., most of which has since been published in pharmaceutical or chemical journals.

In section four, relating to professional matters, the present position of pharmaceutical education, the professional standing of the pharmacist in the various countries, and the limitation of pharmacies brought on a lengthy discussion introduced by a report on the educational methods and the compulsory examination in the principal continental countries, resulting in the customary resolutions dealing with the subjects altogether from a French and Belgian point of view.

Discussions on the questions whether apprenticeship should be placed before, during or after the academic instruction of the pharmacist, as well as disputes on the inspection of pharmacies, on trade-marks and some other topics remained without result, likewise an exchange of opinion on standardization methods and on urinology.

In conclusion, the president, Mr. *Petit*, and the acting secretary, Mr. *Crinon*, addressed the meeting, giving a brief review of its proceedings and expressed the hope of meeting again at the next international pharmaceutical congress in some convenient continental city.

In a candid retrospect on the origination, the transactions and the success, or utter want of success, of the series of these so-called

international pharmaceutical congresses, commencing at Brunswick in 1864 and, as it is to be hoped, adjourned *ad infinitum* at Paris in 1900, it cannot but be conceded that they have failed to realize the anticipations once attributed to them and to bring about some practical or tangible results for the consolidation and advantage of pharmacy in the various countries in the course of the evolution through which it has been passing in the ways and byways of medical, sanitary and industrial progress. These congresses have never been international, except in name, either in representation or in numbers, and have more and more departed from their primary and essential aims and objects. Beyond the constantly recurring series of stereotyped questions and futile resolutions they have accomplished nothing of productive and enduring consequence.

Whilst the First International Congress originated in 1864, as a protest of French and German pharmacists against the growing nostrum evil and the initial stages of the modern industry of pharmaceutical specialties and proprietaries, it may not be amiss, in conclusion, to point to the striking fact that the Ninth Congress, in 1900, after a lapse of thirty-five years, presented the aspect of still indulging in unavailing deliberations on rather effete and doctrinal problems, while at the same time and place it was confronted by a kindred well attended congress of pharmaceutical manufacturers from twenty-six European, American and North African countries, convened for the purpose of securing for their calling and products (pharmaceutical specialties and proprietaries) a greater legal recognition as one of the substantial and important factors in the industrial, commercial and economic concerns of the world.

In addition it may also be mentioned as a sign of the altered conditions and the drift of modern medication that at the International Exposition in Paris, in 1855, ten years before the First International Pharmaceutical Congress took place, only five exhibitors of pharmaceutical specialties figured in the catalogue of the exhibition, whilst they numbered about 400 at the Exhibition in 1900 at the time of the Ninth Congress.

This remarkable transition in the domain and functions of pharmacy and medication to less orthodox modern methods and uses or abuses has been still more sweeping in the United States of America in the course of the second half of the nineteenth century.

The other primary motive for calling these congresses was the

desire for the creation of an international pharmacopœia, or at least of a code tending to bring about a greater uniformity in the formulæ for the potent pharmacopœial preparations. Every effort of the successive congresses for the realization of this desideratum by the adoption of resolutions and the appointment of committees has failed. Meanwhile the national pharmacopœias of the principal countries have in the course of periodical revisions attained to greater completion and a progressive and serviceable approximation of their formulæ for and the standardization of, potent remedies. This gradual approach to a desirable consummation is evident in the recently issued revised editions of the pharmacopœias of Great Britain with its addendum for the East Indian Empire, of Germany, and last but not least in the forthcoming eighth edition of the pharmacopœia of the United States of America.

BERLIN, April, 1901.

SYRUPUS FERRI QUININÆ ET STRYCHNINÆ PHOSPHATUM.

By CHARLES H. LAWALL.

This preparation, which is of English origin, has been variously known as Easton's syrup, Aitken's syrup and syrup of triple phosphates and has always occasioned more or less discussion as to the method of producing a permanent preparation.

The earliest formula—that proposed by Dr. Aitken himself—possessed three distinct steps. First, the preparation of ferrous phosphate by precipitation of solution of ferrous sulphate with sodium phosphate. Second, the preparation of quinine alkaloid by treating quinine sulphate with ammonia water. Third, the solution of these well washed precipitates together with strychnine in diluted phosphoric acid; sugar was afterwards added and dissolved by agitation to form a syrup.

The original process was somewhat vague in its wording so that different manipulators obtained varying results, but it was no doubt intended that the preparation should contain the following ingredients in each fluid drachm—quinine sulphate 1 grain, strychnine sulphate $\frac{1}{32}$ grain and ferrous phosphate 1 grain.

The trouble in making a permanent preparation probably started with the original formula, and for many years change after change was suggested, until, at the present time, the British Pharmacopœia and the United States Pharmacopœia both contain processes which are essentially different, and both of which have the same disadvantages regarding the lack of stability of the preparation.

The variation in the strength of the preparation since Dr. Aitken's original formula is noteworthy; the present U.S.P. giving a preparation which contains 1 $\frac{1}{8}$ grains of iron phosphate, 1 $\frac{3}{4}$ grains quinine sulphate and $\frac{1}{88}$ grain of strychnine to the fluid drachm; while the present B.P. gives 1 grain ferrous phosphate, $\frac{4}{5}$ grain quinine sulphate and $\frac{1}{32}$ grain strychnine to the fluid drachm.

Many authors considered the difficulty of precipitation as being due to the ferrous phosphate, so many changes were proposed in this ingredient some changing this ingredient to ferric phosphate which is the salt present in the U.S.P. preparation. Among the compounds of iron which were used may be mentioned ferrous sulphate, solution of ferric sulphate, solution of iron and sub-sulphate and at the present time the British Pharmacopœia directs the use of iron wire and phosphoric acid, thus forming ferrous phosphate; while the United States Pharmacopœia takes the scale salt, known as iron phosphate, which is in reality a citro-phosphate of ferric iron and sodium.

The British process was suggested by R. Wright at the British Pharmaceutical Conference in 1893; but the idea was first suggested by Simonson in a paper read before the Ohio Pharmaceutical Association in 1890; Wright, however, not giving credit to Simonson for the work previously done on the subject.

The most recent paper, which has dealt with the subject, is that of F. W. Haussmann in the AMERICAN JOURNAL OF PHARMACY for May, 1900, in which he states that the main trouble is due to caramelization of the sugar, thereby causing the preparation to darken in color. He made some experiments with a view to reducing the quantity of acid in the preparation, but upon cutting down the amount of phosphoric acid, the preparation lost its former stability.

As it stands at present, the preparation is fairly permanent as far as precipitation goes, but is very prone to darken upon standing and the difficulty has been experienced of having sulphuretted odors evolved upon standing, in cases where the preparation has been made with the use of granulated sugar, which contained

ultramarine. Another trouble has sometimes been experienced which is caused by impurities in the glycerin, such as the presence of compounds of fatty acids, which are liberated by the phosphoric acid, thereby causing a disagreable odor.

A suggestion as to the avoiding of the coloration, due to caramelization, which has given satisfactory results in practice, is a very simple one and consists in making up a preparation of the iron phosphate, quinine, strychnine and glycerin. This is made up according to the U.S.P. directions for making the syrup, but instead of mixing with the syrup right away, it is held in readiness for extemporaneous preparation of the syrup at any time necessary.

Divided up in this manner it will be seen that this glycerite makes approximately 250 c.c. and by making it up to that quantity with glycerin, which is the amount necessary for 1,000 c.c. of syrup, it can be held in readiness and used at any time in the proportion of one part of this so-called glycerite to three parts of pure simple syrup, both by volume. If this suggestion is followed no trouble will be experienced of having the product caramelized while in stock and it can always be sent out in a practically colorless condition.

This so-called glycerole has been made and kept in the undiluted condition for three months without alteration, so it is a practical means of overcoming a hitherto unsurmountable difficulty.

An experiment was made using glucose syrup as a base instead of ordinary syrup, but the presence of calcium sulphite as a preservative in the glucose made it very objectionable from the liberation of SO_2 by the action of the phosphoric acid.

The best results were obtained by the use of a syrup made from rock candy instead of the ordinary granulated sugar.

EDITORIAL.

THE AMERICAN PHARMACEUTICAL ASSOCIATION.

During the past year a number of writers have pointed out what seemed to be to them the needs of the American Pharmaceutical Association and, in some instances, have outlined methods to make it more successful numerically. One writer considers that it "needs new blood—good red blood" and another thinks it needs "the transfusion into its veins of some younger twentieth century blood."

These thoughts can be interpreted in several ways. According to the one the Association needs a vitalizing something and according to the other we must wait for a number of years for this new twentieth century blood to take on the responsibilities of manhood. A combination of the ideas of these writers—neither complete without the other—teaches that it is with associations as with men—they only are truly successful who so conduct their lives that they live to-day for to-morrow. The A.Ph.A. in other words needs the transfusion of new blood to-day for the good it will do to-morrow. This is in exact accord with the experience which teaches that leaders of associations, as well as masters of any undertaking, must have served a period of apprenticeship. New members must wait and learn before they can help in judiciously solving the great problems confronting large associations. If we think for a moment of the men at the helm of the A.Ph.A. we see men who are still active; men who have regularly attended the meetings and participated in its councils for years and men who have persistently looked after the interests and honor of the Association. Do we think for a moment that they have done this with an eye single to their own interests? Rather do we not see that they have done all this with a love for, and pride in, the Association. The A.Ph.A. stands for something to-day because there are many men who have served her in season and out of season. The new members, like the new blood corpuscles, must pass through a long and useful course and get in line (form a *rouleau,* so to speak) finally to be honored with true comradeship. The A.Ph.A needs the blood, but it must do more than get it—it must see that it passes to this stage of usefulness.

There never was a time when all the members were so active in endeavoring to make the Association of value. The action of the Section on Scientific Papers, in limiting the time for the reading and discussion of papers, has made the meetings of this section of very great interest. We believe, too, that there never was a time when the work done in this section was more creditable to the Association and more beneficial to pharmacy at large than to-day. It is well known that at the Pharmacopœial Convention it was the active members of the A.Ph.A. that contributed so much to its success.

The section on Education and Legislation has had a beneficent influence on the teaching in colleges and on State Legislation. The

most important results of this section we believe, however, are yet to come. From this section has grown "The Conference of Teaching Faculties," "The Conference of Members of Boards of Pharmacy" and "The Conference of State Pharmaceutical Association Secretaries." There are many indications that the active members of the A.Ph.A. will contribute as much in elevating the educational courses at the various colleges and in conducing to a wise legislation in the various states in the future as they have in the past.

The Commercial Section has been productive to the Association in more ways than one. The creation of a section on Practical Pharmacy and Dispensing is largely the outcome of the work done by Mr. Hynson. This section has done much good already and is likely, through the Sander prize of $50, to be productive of even greater good to the retail pharmacists of this country. Then there is the Committee on Exhibits who are arranging for an exhibition at the St. Louis meeting of drugs, chemicals, pharmaceutical preparations, dispensing apparatus, prescription helps, novelties in labels and dispensing, etc. The work of this committee promises to be very instructive.

When we consider all these profitable and interesting features it is apparent that the A.Ph.A. was never more alive than to-day. The following provisional program shows in what manner the St. Louis meeting will be one of profit and pleasure:

Sunday, September 15—Reception of incoming delegates.

Monday, September 16—10 A.M., Council meeting. 3 P.M., First general session. 8 P.M., Reception in parlors of Southern Hotel.

Tuesday, September 17—9 A.M., Session of Board of Trustees United States Pharmacopœial Convention. 10 A.M., Second general session. 3 P.M., Meeting of Commercial Section. 8 P.M., Visit to St. Louis Exposition and Music Hall.

Wednesday, September 18—9 A.M., Meeting of committee for revision of United States Pharmacopœia. 10 A.M., Third general session, devoted to discussion of exhibits. 3 to 10 P.M., Steamboat excursion on the Mississippi River.

Thursday, September 19—9 A.M., Meeting of the Conference of teaching faculties. 10 A.M., Meeting of section on practical pharmacy and dispensing. 3 P.M., Meeting of scientific section. 8 P.M., Meeting of scientific section.

Friday, September 20—9 A.M., Conference of members of boards of pharmacy. 10 A.M., Meeting of scientific section. 3 P.M., Meeting of section on education and legislation. 8 P.M., Meeting of section on education and legislation.

Saturday, September 21—9 A.M., Conference of state association secretaries. 10 A.M., Last general session. 2 P.M., Trolley ride; visit to Shaw's Garden and Anheuser-Busch Brewing Association plant. 8 P.M., Evening entertainment.

The A.Ph.A. is eliciting attention from every side. More than one member has gotten up circulars calling attention to the benefits of membership in the Association and many members not on the Committee on Membership are asking pharmacists to become members thereof. President Patton, of the Association, has well said in a letter which has been sent out to the retail pharmacists of the United States, "Its strong point is its earnest desire to aid you to become a better pharmacist, to the end that success and all that it implies may be yours."

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Die Mikroskopische Analyse der Drogenpulver. Von Ludwig Koch. Leipzig: Gebrüder Borntraeger. 1901.

The third Lieferung of Volume I of this atlas is devoted to the consideration of the microscopical characteristics of the following barks: Quercus; and quillaja; and woods: Guaiacum, quassia and sassafras. This Lieferung, like the previous two already reviewed in this Journal, gives an accurate description, besides numerous plates of the tissues or fragments to be found in powders of different degrees of fineness. These volumes will be found invaluable to the pharmacist and no doubt will have an extended sale, as there has been nothing like them heretofore published and the work has been well executed in almost every particular.

Select Methods in Food Analysis. By Henry Leffmann and William Beam. Philadelphia: P. Blakiston's Son & Co. 1901.

This work gives a concise summary of analytical methods in food analysis. The subject is treated from a chemical and in many instances also from a microscopical point of view. Numerous illustrations and four full-page plates have been incorporated. The contents include: I, Analytic Methods: (1) Physical Data; (2) Chemical Data. II, Applied Analysis: (1) General Methods; (2) Special Methods for the following: Starch, flour, and meals, bread, leavening materials, sugars, honey, candies and confections; fats and oils; milk and milk products; tea, coffee and cacao; condiments and

spices; alcoholic beverages; flesh foods. An appendix of use ul tables, etc., concludes the book.

The work will prove of considerable value to analysts, particularly as many of the bulletins of the United States Department of Agriculture and of the Association of Official Agricultural Chemists are out of print and the others are with difficulty obtained. The authors' wide experience in practical analytical work and ability in culling the more valuable methods from the large amount of published matter, have particularly fitted them for the task in hand and the work has been done accordingly.

THE INDIAN DOCTOR'S DISPENSATORY being Father Smith's advice respecting diseases and their cure. By Peter Smith, of the Miami country. Cincinnati: Printed by Browne and Looker, for the author. 1813.

This is Bulletin No. 2 of the reproduction series of the Lloyd Library of Botany, Pharmacy and Materia Medica, Cincinnati, O. Peter Smith's dispensatory is probably the rarest book on pharmacy, there being but one copy known to be in existence. An interesting biography of Peter Smith, by Professor Lloyd, accompanies the volume. These reproductions can be had at the nominal price of $1.00 per issue by addressing the Lloyd Library, Cincinnati, O. The third bulletin will probably consist of a facsimile of the Materia Medica Americana, by Schoepf, the first botanical work connected with American medicinal plants.

BILTMORE BOTANICAL STUDIES. A journal of botany embracing papers by the director and associates of the Biltmore Herbarium. Biltmore Herbarium, Biltmore, N. C. William Wesley & Son, London.

Volume I, No. 1, consists of "Revision of the Species of Marshallia," by C. D. Beadle and F. E. Boynton; "Notes on Certain Coneflowers," by C. L. Boynton and C. D. Beadle; "New or Little Known Species of Trillium," by T. G. Harbison; "New Species of Thorns from the Southeastern States," and "A Shrubby Oak of the Southern Alleghanies," by C. D. Beadle. Eleven well executed plates on Marshallia accompany the number. Each one of these articles contains a number of new species which are well founded, and will stand the test of careful scrutiny which cannot always be said of new species that are being made. It is extremely fortunate that

the excellent work being done by Mr. Beadle, director of the Biltmore Herbarium and his associates, is being published and thus conserved and it is hoped that other numbers will quickly follow.

ILLINOIS PHARMACEUTICAL ASSOCIATION.[1]

The twenty-second annual meeting was held at Rock Island, June 11–13. The President, Walter H. Gale, in his address approved of the action of the Association two years ago, when it decided to discontinue committees on scientific papers and other similar subjects, leaving to the A.Ph.A. scientific and educational matters. He felt that the I.Ph.A. should busy itself with trade and legislative matters.

In regard to the Illinois pharmacy law, he stated that the new law is much more satisfactory than the old one. President Gale also called attention to the *pure food law* now in force, and said that it contained but little of interest to pharmacists. The report of the operation of the law for twelve months shows that the only line of goods covered by the law in which pharmacists are interested (spices and flavoring extracts) generally come up to the required standard, the only exceptions being in some goods found in grocery stores. The president also called attention to the Illinois law covering the *sale of cocaine* and other similar narcotics. He said that 300 ounces of cocaine per month are sold on State Street within quite a limited district. He felt the present law was sufficient to meet the case if it can only be enforced.

The committee in reporting on this address, recommended that the Association issue a volume similar to the *Badger Pharmacist* of Wisconsin, and include the history now being prepared by A. E. Ebert, historian of the Chicago Veteran Pharmacists' Society.

Trade interests was the subject of separate papers by W. F. Bodeman and John Stucklich.

Mr. Bodeman said that he had been in this country thirty-four years and during all that time druggists cried hard times and compared trade with the good old times of early days. He urged pharmacists to write for journals and become better readers of pharmaceutical periodicals. He insisted upon hiring good apprentices and giving them the proper training, stating that the metric system should not be overlooked, and laid stress upon the importance of arithmetic. His parting advice was, let the druggists of this land get together and broaden their minds. Mr. Stucklich advocated judicious advertising by show windows, neat circulars, booklets, samples, newspapers, etc. Cash trade was approved; personal con-

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[1] Meyer Bros. Druggist, p. 206; *Nat. Drug.*, p. 232; *West. Drug.*, p. 324.

duct given attention; the relation of doctor and druggist not forgotten. Such side lines as shoe polishes and stains, photographic goods and spectacles were named as worthy of trial. T. V. Wooten, Chairman of the Committee on Trade Interests, said that side lines were spoken of as the tendency of the hour, but rather deplored. He considered that dispensing physicians are increasing in number. He said self interests always point towards co-operation with the physician whenever possible. Substitution was condemned. Neat packages and uniformly good preparations were noted. He said that counter prescribing seldom pays in the long run. Farming out small retail stores by jobbers was condemned. Retailing by wholesalers received attention. Commercial pharmacy as a college course was emphasized.

Professor Oldberg, Chairman of the Committee on United States Pharmacopœia, presented a very comprehensive report, which was referred to the Committee of Revision of the United States Pharmacopœia.

The report of the Advisory Committee, Department of Pharmacy, University of Illinois, was to the effect that during the year the committee had conferred with the faculty of the school at Champaign and the Board of Trustees, and, as a result, the course has been extended, the faculty enlarged, and instruction in physiology added to the curriculum.

The following officers were elected for the ensuing year:

President, Walter H. Gale; Vice-Presidents, Henry Swannell, J. B. Mount and Franz Thomas; Secretary, R. N. Dodds, Springfield; Treasurer, George C. Bartells.

The time and place of the next meeting was left to the Executive Committee, to be appointed later by the president.

KENTUCKY PHARMACEUTICAL ASSOCIATION.

The twenty-fourth annual meeting was held at Crab Orchard Springs, June 18–21. The President, C. Lewis Diehl, in a very able address[1] in which he touched not only State but national affairs, said in part as follows:

"Next to the U. S. Pharmacopœia the National Formulary should appeal most forcibly to our sense of responsibility, but it is plain that in this respon-

[1] *Ph. Era.*, p. 42.

sibility practitioners of medicine must share equally. Unfortunately the latter, as a class, have not taken very kindly to either of these authorities in recent years, though there are notable exceptions, and much missionary work seems to be necessary to convince them of their importance. Towards this our Association has also contributed its mite, through the excellent exhibit of N. F. preparations at the Paris meeting, and, more particularly, through our very efficient chairman of the Committee on Papers and Queries, Mr. Henry W. Preisler, who by his individual efforts has induced the physicians in his own locality to use many of the N. F. preparations, to the exclusion of corresponding proprietaries, and has thus set a practical example of what may be done. Last year your attention was called to an "Epitome of the National Formulary, compiled for the purpose of familiarizing physicians with the preparations of the N. F. The distribution of this little work is possible only through the aid of the State and local associations, and it is therefore a matter of regret that more definite action was not taken at last year's meeting with this end in view. I urgently advise that some action be taken at this meeting that shall assure its wide distribution among physicians of our State, feeling confident that this will be followed by a demand for many of the excellent preparations of the N. F.

"When the so-called proprietary specialties were in their incipiency, the Louisville College of Pharmacy adopted a series of formulas for Elixirs and Wines, which, at the time, drove the proprietaries then in vogue from the local market. This Association afterwards adopted the same formulas, with some additions—testimony that Kentucky pharmacists were early alive to the importance of fighting the innovation of the specialty makers. Indeed, although the immediate incentive to the "National Formulary" is properly credited to the efforts of the pharmacists of New York and Brooklyn, who offered their "Formulary" to the American Pharmaceutical Association as a nucleus for a national work, this preliminary work of the Louisville College of Pharmacy doubtless had its influence on the character and contents of the National Formulary. But what I particularly wish to emphasize is, that although an apparent unit in upholding the integrity of the National Formulary individuals in our midst do not hesitate to use these formulas, under coined names and possibly slight modifications, for the exploitation of their private interests; and while it is difficult here to draw a line on purely ethical grounds, it is plain to me that co-operation on the lines of the "Golden Rule"—but not as interpreted by David Harum—would have salutary effect in maintaining the dignity of our profession."

The following papers were presented:

"Should Purity be the Prime Consideration?" By J. W. Gayle and Vernon Driskell.

"Buying Goods." By Addison Dimmitt and J. W. Gayle.

"How to Keep Good Clerks." By R. M. McFarland.

"Drug Store Rules." By Addison Dimmitt.

"The Pharmacist from a Professional and from a Mercantile Standpoint." By Vernon Driskell.

"The Dispensing Counter." By Vernon Driskell.

"Postage Stamps, Telephones, etc." By Vernon Driskell.

The following officers were elected for the ensuing year:

President, John L. Clark; Vice-Presidents, H. K. McAdams, G. E. Townsend and J. B. Ross; Secretary, J. W. Gayle, Frankfort; Treasurer, Vernon Driskell; Chairman of Executive Committee, Chas. A. Edelen, Louisville.

Grayson Springs was selected as the next place of meeting, time to be fixed by the Executive Committee.

LOUISIANA PHARMACEUTICAL ASSOCIATION.[1]

The nineteenth annual meeting was held in New Orleans, May 10th. The President, M. Bernstein, recommended among other things that Congress be requested to assist in the passage of the bill defining the status of the navy pharmacist. Also that an act be drafted regulating the hours of labor, sale of poisons, the vending of drugs by country stores within a certain radius of a drug store and the examination of physicians who have opened drug stores since the passage of the law; also requiring all pharmacists to register annually, on payment of a nominal fee.

One of the features of the session was an address by Prof. H. V. Arny, of Cleveland, O., on some of the chemical possibilities of Louisiana. He said that he would purposely omit sugar from his address, inasmuch as the subject could not be included within a brief paper. The speaker dwelt interestingly on the products that could be made from turpentine, namely, camphor, lavender perfume, etc. Another possibility was the development of the industry of making orange flower water from the petals of the orange blossom.

The following officers were elected: President, W. T. Taylor; Vice-Presidents, J. L. Viallon and Alfred Levy; Corresponding Secretary, Miss M. E. Holden; Recording Secretary, W. P. Duplantis; Treasurer, George S. Brown; Executive Committee, William M. Levy, P. Asher, James E. Bays, Adam Wirth and P. L. Viallon.

The following members of the Association were selected for the Board of Pharmacy: P. L. Viallon, President; W. T. Taylor, President *pro tem;* F. C. Godbold, Secretary; Examining Committee, George S. Brown, Chairman; William Levy, Max Samson; Fin-

[1] *Pharm. Era*, p. 547.

ance Committee, M. Bernstein, Paul Fleming and E. N. Roth. Examinations will be held in February, May, August and November.

MARYLAND PHARMACEUTICAL ASSOCIATION.[1]

The nineteenth annual meeting was held July 16th, at Ocean City. The President, Wm. E. Turner, in his address recommended that the Legislative Committee organize auxiliary committees in every county of the State to go to work at once to bring the passage of a pharmacy law to a successful issue; that the next semi-annual meeting of the Association be held in Annapolis during the organization of the Senate and House of Delegates, and that "we strive diligently to more closely unite the profession of medicine and pharmacy, and that we co-operate with other bodies of a like character in the erection of a suitable memorial to Prof. Wm. Procter, Jr."

The Association decided to continue the agitation for a national pure food and drug law, as also to endeavor to have such a law enacted for Maryland.

The Treasurer reported a gratifying balance in the Treasury. The accessions during the year were larger than any preceding year, they amounting to 33 per cent. of the membership. The report on the Progress of Pharmacy was a most comprehensive and instructive paper. Under Trade Interests an animated discussion arose as to the affiliation with the N.A.R.D., ending in a resolution to that effect, as well as to the adoption of the Worcester plan, both meeting with the approval of a large majority.

The chairman of the Committee on Adulterations, H. P. Hynson, gave an account of the examinations made by himself of several popular preparations.

The subject of wood alcohol was touched upon. This dangerous substitute for grain alcohol had been found in the product of but one concern, although several others had been examined. One sample of essence of ginger was found to contain only 33 per cent. of ethyl alcohol, when the proportion should have been 95 per cent. Tincture of iron was examined, but none of the seven specimens submitted to tests contained wood alcohol. Several, however, contained not more than 55 per cent. of grain alcohol, when 75 per cent. was required by the United States Pharmacopœia. The quantity in one sample was not more than 5 per cent. Of six lots of tincture of iodine examined, two were made with wood alcohol, and all but three proved to be greatly deficient in iodine. Much adulteration was shown in the common seidlitz powders. The

[1] *Ph. Era*, p. 112.

number of samples with an over-weight in the quantity of the chemicals required was as large as that with insufficient quantities.

An animated discussion was occasioned by C. H. Ware's paper in reply to the query, "Can the Retail Pharmacist Make his own Secret Preparations with Financial Success to Himself?" It was finally decided that he could.

The election resulted in the choice of the following officers: President, Louis Schulze; First Vice-President, J. Webb Foster; Second Vice-President, Eli T. Y. Reynolds; Third Vice-President, Otto G. Schumann; Secretary, Owen C. Smith; Treasurer, John G. Beck, Baltimore; Executive Committee, W. U. Powell, W. E. Brown, H. Lionel Meredith.

The next annual meeting will be held at the Blue Mountain House about June 20, 1902, in joint meeting with the Pennsylvania Pharmaceutical Association, which meets at Buena Vista, Pa.

MASSACHUSETTS PHARMACEUTICAL ASSOCIATION.[1]

The twentieth annual meeting was held at Fall River, June 11–12. F. A. Hubbard, the President, delivered an address devoted principally to the consideration of problems that confronted the pharmacists of that state. The Secretary, James F. Guerin, reported an increase in membership. The report of the Treasurer, T. B. Nichols, showed a balance in the treasury. The Committee on President's Address recommended among other things, "the endorsement of the work of the Massachusetts College of Pharmacy; the establishment of a scholarship in the College of Pharmacy, the expense to be $130 per year, the board of directors of this Association to direct all the details of the scholarship."

The following papers were presented:

"Inter-Relation of Medicine and Pharmacy." By the late Professor Greenleaf. This was presented by C. F. Nixon, being the last work from the pen of Dr. Greenleaf and was somewhat incomplete, he evidently having expected to revise it.

"Pharmaceutical Legislation." By W. J. Bullock.

"Unregistered Clerks and Registered Druggists." Mr. Hielberg suggested a change in the pharmacy law to the effect that the Board of Pharmacy should have the power to grant a certificate for a limited time to registered druggist for his unregistered clerk.

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[1] *New England Druggist*, p. 438; *The Spatula*, June; *Pharm. Era*, p. 690.

"Liquor Thymoli Compositus, or Antiseptic Solution." By W. L. Scoville. It differs from other similar formulas in using oil of *Eucalyptus odorata* instead of eucalyptus globulus, the former being much sweeter and more pleasant in flavor, and in the use of natural benzoic acid sublimed from benzoin in the place of artificial acid made from toluol. The natural acid is not only softer in odor and flavor, but it is also more soluble in water. Costs more than the artificial, but it produces a very different effect.

Thymol, 1 gramme or ʒi; oil of Eucalyptus odorata, 2 c.c. or ʒii; oil of gaultheria, 0·75 c.c. or M xl; oil of peppermint, 0·20 c.c. or M x; natural benzoic acid, 8 grammes or ℥i; fluid extract of baptisia, 8 c.c. or ℥i; boric acid, 24 grammes or ℥iii; alcohol, 375 c.c. or O iii; water, 675 c.c. or O v; talcum, 20 grammes or ℥iiss.

Dissolve the thymol, oils, benzoic acid and fluid extract in the alcohol and add the talcum. Dissolve the boric acid in the water, previously heated, and add to the alcoholic liquid and shake occasionally during seven days or longer (the longer the better) then filter. The real secret (?) of the above formula lies in the variety of eucalyptus employed and the character of the benzoic acid.

"Glycerin Tonic Compound." By W. L. Scoville. Formula:

Gentian root, ground, 20 grammes; taraxacum root, ground, 30 grammes; sugar, 150 grammes; spirit of orange (U.S.P.) 10 c.c.; tinct. cardamom comp., 60 c.c.; solution of saccharin (N.F.) 20 c.c.; phosphoric acid (85 per cent.) 5 c.c.; acetic ether, 2·5 c.c.; glycerin, 400 c.c.; sherry wine, q. s. to make 1,000 c.c.

Moisten the drugs with the spirit of orange and about 10 c.c. of wine and pack in a small percolator. Pour on wine to cover the drugs and when the liquid begins to drop, close the lower orifice of the percolator and allow to macerate twenty-four hours. Then allow to drop slowly, regulating the flow to about one drop in five or six seconds, and pass enough sherry wine through the drugs to obtain 400 c.c. of percolate. In this dissolve the sugar and filter, if necessary. Then add the other ingredients in order, and finally enough sherry wine to make a total volume of 1,000 c.c.

The election of officers resulted as follows: President, L. G. Heinritz; First Vice-President, William J. Bullock; Second Vice-President, C. P. Flynn; Third Vice-President, James C. Brady; Secretary, James F. Guerin, of Worcester; Treasurer, Thomas B. Nichols. Henry Canning, Boston; F. E. Mole, of Adams and J. F. Bartlett, of Great Barrington, were re-elected trustees of the permanent fund. It was voted that the President, the three Vice-Presidents and the Secretary constitute the Executive Committee.

MISSOURI PHARMACEUTICAL ASSOCIATION.

The twenty-third annual meeting was held at Pertle Springs, Warrensburg, June 18–21, 1901. The address of the President, Paul L. Hess, embodied the events of the year in pharmaceutical

circles and was full of suggestions for the advancement of pharmacy. The Secretary, H. M. Whelpley, showed that 400 copies of the proceedings, containing eighty-six pages were printed at an expense of $128.93. The average cost of each copy, including postage, amounts to about 35 cents. The Treasurer, Wm. Mittelbach, reported a balance in the treasury. The following papers were read :

"Carbon Molecules." By. J. F. Llewellyn.

"Pharmaceutical Notes." F. Hemm contributes the following : "Sodium phosphate (granular or crystallized) should be bottled in air-tight containers; crystallized sulphate of iron should be put into bottles; and a new air-tight stopper, but one easier of removal is desired for potassium bromide bottle. Sealing wax has been used on chloroform and bromoform containers lately and should be condemned. On dispensing a proprietary preparation on the doctor's prescription the writer suggests that the pharmacist only dispense from an original bottle or package—or when this is not possible, let the prescription pass on. The author also notes that according to Merck's Index sparteine sulphate is always acid in reaction whereas the U. S. P. says that it reacts neutral with litmus paper."

"The German, British and United States Pharmacopœia." G. Hinrichs critically compares these three authorities and hopes that "the Committee of Revision will produce a Pharmacopœia that will permit them to keep alive when that Pharmacopœia shall be enforced."

"Medicines Prescribed by 108 St. Louis Physicians." H. M. Whelpley gives some interesting statistics.

"Compound Extract of Salyx." A. C. Chenoweth and W. K. Ilhardt found it to be a name for a preparation containing salicylic acid, put upon the market for preserving fruits, vegetables and liquids by California cold process.

"Some Narcotic Plants." J. F. Lewellyn gives an interesting account of narcotics which are used and some of the myths concerning them.

"Preserved Hydrogen Peroxide." C. G. Hinrichs suggests that pharmacists test the brands marked 3 p. c. U.S.P. for the presence of alcohol and for the degree of acidity.

"Powdered Cocoa." Francis Hemm reported on the examination of four commercial brands.

"Mistura Chlorali et Potassii Bromidi Composita." H. M. Pettit, Chairman of the Committee on National Formulary asks, in his report, "would it not be well to omit the extract of Cannabis Indica or replace it by some other ingredient to answer the same purpose ?"

The following officers were elected for 1901–1902 :

President, Otto F. Claus ; First Vice-President, R. L. Hope ; Second Vice-President, W. B. Kerns ; Third Vice-President, H. C. Wesner ; Treasurer, Wm. C. Mittelbach ; Secretary, H. M. Whelpley. The place and date of next meeting is Pertle Springs, June 10–13, 1902.

NEBRASKA PHARMACEUTICAL ASSOCIATION.[1]

The twentieth annual meeting was held May 7–9th, at Lincoln. The President, A. W. Buchheit, in his address, among other things, said that while the examinations in pharmacy, materia medica, chemistry and toxicology are certainly the necessary and fundamental requirements for a candidate's fitness for a certificate, a thorough general education, at least that afforded by a complete course in the high schools, should be required.

An interesting feature of the meeting was a lecture by Prof. Oscar Oldberg, Northwestern University.

The following officers were elected for the ensuing year: President, P. Strausbaugh; Vice-Presidents H. E. Brown, E. J. Kelso, J. F. McKinley, Victor Yoeman, C. E. Hopping; Secretary, W. M. Tonner, Randolph; Treasurer, Carl Speilman. Recommended for Board of Examiners: D. J. Fink, Holdredge; W. W. Kendall, Superior; N. A. Kuhn, Omaha.

NEW JERSEY PHARMACEUTICAL ASSOCIATION.

The thirty-first annual meeting was held in Trenton, N. J., May 22 and 23, 1901. The President, Stephen D. Wooley, delivered an address devoted to a recapitulation of the chief events in the history of the Association during the past year. The report of the Secretary, Frank C. Stutzlen, showed a membership of 383, an increase of 19 over last year. The report of the Treasurer, James C. Field, showed the finances of the Association to be in good condition. The Secretary of the Board of Pharmacy, Henry A. Jorden, showed that 74 passed the examinations for Registered Pharmacists, and 18 for Registered Assistants; and that the total number on record in good standing of Registered and Assistant Pharmacists was 1776. The report of the Treasurer of the Board of Pharmacy, William T. Brown, showed the finances to be in good condition.

The following is a list of the papers which were presented:

"The Growth and Collection of Narcotic Drugs." By F. B. Kilmer. The author considered particularly those drugs indigenous to Jamaica, the continent of Europe, England and United States.

"Cotton Seed Oil." By P. E. Hommell. The author considers the use of cotton seed oil in the preparation of various medicaments and claims that olive oil should replace it for medical purposes.

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[1] *Omaha Druggist*, p. 20.

"Alcohol Deodoratum." By P. E. Hommell. The author concludes that deodorized alcohol should replace alcohol in the preparation of elixirs, essences and tinctures.

"Collinsonia Canadensis." By H. J. Lohmann. The author has isolated an alkaloid to which he attributes the diuretic action of the drug, the resin being irritant.

"Condurango." P. E. Hommell. The author says that preparations from good, well-preserved specimens would form valuable alteratives, if one or more of the recognized mineral alteratives were also added.

"Liquor Ammonii Anisatus." G. W. Parisen gives the formulæ of the German and Danish Pharmacopœias. G. E. Thurman proposes the formula: Oleum anisi, 3 parts; aqua ammoniæ, 15 parts; alcohol, q. s. to make 100 parts.

"Liniments, Ointments and Plasters." G. W. Parisen has observed in an examination of 4,000 prescriptions that there were thirty-eight liniments, fifty-six ointments, but no plasters prescribed.

"The Education of Apprentices" was answered by C. J. Schudde, who said that the pharmacist should take as an apprentice a boy with sufficient knowledge of reading, writing and arithmetic, and make a business man as well as a pharmacist of him.

"Hospital Dispensaries." C. H. Landell asserts that "four out of every ten dispensary patients can afford to pay for their medicines, and to give such persons free medicine is no charity in the least."

The following officers were elected for 1901–1902: President, James Foulke; First Vice-President, Hermann J. Lohmann; Second Vice-President, George S. Campbell; Secretary, Frank C. Stutzlein; Treasurer, James C. Field. The next meeting will be held at Atlantic City.

NEW YORK PHARMACEUTICAL ASSOCIATION.[1]

The twenty-third annual meeting was held in Buffalo, June 4–8, 1901. The President, Felix Hirseman, in his address, dwelt upon the accomplishments of the N.A.R.D. and upon the passage of the new pharmacy law. The report of the Secretary, J. B. Todd, showed the Association to be in healthy condition. The Treasurer, T. W. Dalton, reported a creditable balance. The following papers were presented:

"The Lloyd Reaction for Morphine." By Joseph Mayer. (See this JOURNAL, p. 353).

"Synthetic Remedies as Poisons." By Edward Klein.

"The Habitat of Drugs." By Walter Bryan (See *Pharm. Era*, p. 670).

"Shop Notes and Dispensing Hints." By W. A. Dawson.

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[1] *Amer. Drug. and Pharm. Record*, p. 327; *Pharm. Era*, p. 651.

"A Few Facts About Vaccine and Vaccination." By Frederic P. Tuthill. (See *Bull. Pharm.*, p. 334).

"The Advertising Druggist." By Judson B. Todd.

"Should the Pharmacy Law be Amended?" By Edward S. Dawson. (See *Amer. Drug.*, p. 15).

The Committee on New Remedies presented a valuable report (*Amer. Drug.*, 355) through the Chairman, A. L. Goldwater.

The following are the officers for 1901–1902: President, Thomas Stoddart; First Vice-President, J. F. Van Nort; Second Vice-President, Geo. H. Hitchcock; Third Vice-President, A. S. Van Winkle; Secretary, Judson B. Todd; Treasurer, Thomas W. Dalton.

The preliminary report of the President, Robert K. Smither, of the New York State Pharmacy Board, is interesting, particularly that relating to the adulteration and substitution of drugs.

The Board of Pharmacy being required by the new law to see that all pharmaceutical preparations sold in pharmacies and drug stores of New York conform to the standard and tests prescribed in the U.S.P.

"The Board has started out with the assumption that the average druggist or pharmacist is desirous of having his drugs and galenical preparations fully up to the standard, and that whenever it is demonstrated that he is handling an inferior quality he will gladly remedy the defect; and further, that among those who have knowingly handled an inferior article are not a few who, weakly surrendering to a spirit of commercialism, have felt constrained to depreciate the quality of their goods in order to meet competition, and who would be more than willing to elevate their standard to that required by the Pharmacopœia if satisfied that their competitors would be compelled to do likewise.

"We have begun the systematic collection and assaying of samples in a friendly spirit, our inspectors on their first tour making no secret of the fact that the samples purchased are for examination, that it is the purpose of the Board to warn the dealer in cases where the samples prove to be below the standard, but not to prosecute upon the evidence thus obtained.

"If, however, a subsequent inspection should reveal an intentional and persistent disregard of the standard the Board will consider it its duty to prosecute the offender.

"An illustration of the necessity for official supervision over the standard of pharmacopœial preparations sold, is furnished by a review of a report received within the past week from a professional chemist, giving the result of his assay of a batch of samples submitted to him.

"Forty-three samples of the tincture of iodine were assayed, the U.S.P. standard for which requires approximately 7 per cent. of free iodine. They showed a strength varying from 1·42 to 7·28; forty-one were below the U.S.P. standard. The lowest in the scale, a little more than one-fifth pharmacopœial strength, was made of wood alcohol as a solvent. Whatever may be said of some of the other samples, the most charitable comment upon the vendor of

this one is that gross fraud was intended. One sample purchased as tincture of iodine turned out to be fluid extract of wild cherry bark, an inexcusable blunder on the part of the seller.

"Assays of thirty samples of tincture of opium were contained in the same report. The pharmacopœial standard for this requires 1·3 to 1·5 per cent. of morphine. The samples submitted showed a variation in strength ranging from 0·35 to 1·6, the lowest being one-quarter the U.S.P. strength and the highest slightly above it. Of the thirty samples, only six were up to the minimum standard of the Pharmacopœia, and but one sample slightly exceeded the maximum. The average strength of the thirty samples was 1·05, but this average was largely produced by eight specimens, which were below one-half U.S.P. strength.

"That so important a preparation as tincture of opium should be sold of such inferior quality is a scandal to our profession and a gross injustice and menace to the public."

NORTH CAROLINA PHARMACEUTICAL ASSOCIATION.[1]

The twenty-second annual meeting was held at Winston-Salem, on June 18th. The President, R. H. Jordan, in his address made a special plea for efforts to increase the membership. At the organization of the Association in 1880 its membership roll was 112, to-day 147, showing that the increase is only 32 per cent. for the twenty-one years, or about one and two-third members annually. While it is understood that death and retirement from business were factors that reduced the percentage largely, the increase is inexcusably small as compared with the enrollment of registered pharmacists, which at the same time was 282, and to-day 530, nearly double. He also called attention to the gradual decline of interest in scientific and practical papers and discussion, a condition which is deplored by the leaders in other pharmaceutical associations, both State and local, besides the North Carolina body.

The following officers were elected: President, E. W. O'Hanlon: Vice Presidents, Henry T. Hicks, W. A. Leslie, G. K. Grantham, Secretary, A. J. Cook, Fayetteville; Executive Committee, B. B. Owens, G. R. Wooten, J. M. Scott, W. H. Macnair; Local Secretary, C. G. Branhan, New Bern.

OHIO PHARMACEUTICAL ASSOCIATION.

The twenty-third annual meeting was held at Dayton, O., July 16th.

[1] *Amer. Drug.*, p. 22

The President reviewed the events of the year and called attention to some of the problems confronting the pharmacists of that State.

The reports of the various committees were read and accepted. The chairman of the Committee on Course of Study in Colleges of Pharmacy made the following recommendations, which were adopted by the Association:

Item 1. That this Association requests the schools of pharmacy located in Ohio to require an entrance admission, leading to a degree, of at least one year's instruction in a standard high school, which should include algebra and natural science.

Item 2. That this Association reaffirms its position of 1896, that schools of pharmacy should have a fixed time for the admission of students who are candidates for a degree in pharmacy, which should be at or near the opening of the school year, and a definite time when the course leading to the conferring a degree shall close.

Item 3. That the Ohio Board of Pharmacy be, and is hereby requested to adopt a rule that after September 1, 1902, it will refuse to recognize as in good standing any school of pharmacy within or without the State of Ohio which fails to require and enforce an entrance qualification equivalent to that proposed in Item 1, or that fails to comply with the conditions relating to the admission of students and the conferring of degrees set forth in Item 2.

The initiation fee for new members was abolished.

The Association commended the Board of Pharmacy on the fact that the number of assistant registered pharmacists had been increased in the last two years.

An auxiliary section was formed and put on an active basis, the object of which will be to protect those members who may be unjustly persecuted or prosecuted under the existing or future laws of this State, to take care of any cases against them, both in the lower and appellate courts, without individual expense to the druggist beyond his per capita fee for membership, membership to be restricted to members of the Ohio State Pharmaceutical Association. A central committee of six was appointed by the President, to have full charge and discretion in doing the work.

The privileges of the floor were extended to Mr. C. H. Jones, organizer of the Ohio Valley Druggists' Association, and to Mr. E. R. Cooper, organizer of the Northern Ohio Druggists' Association.

The following officers were elected for the ensuing year: President, J. C. Firmin; First Vice-President, Chas. Freericks, Jr.; Second Vice-President, G. C. Himmelman; Permanent Secretary, L. C. Hopp, Cleveland; Treasurer, J. H. Von Stein; Executive Committee, F. W. Herbst, J. P. Harley and John Kutchbach. The matter of time and place for next year's meeting was left to a central committee.

PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.[1]

The twenty-fourth annual meeting of the Pennsylvania pharmaceutical Association was held at Harvey's Lake, near Wilkesbarre, Pa., June 18–21. After the usual welcome, the President, S. K. Hammond, made the annual address.

The reports of the Secretary and Treasurer were then received, the latter reporting a creditable balance. The Executive Committee presented their report through Mr. Gorgas, eighteen new members being received.

A communication was received from the Secretary of the N.A.R.D., stating that the Association was entitled to one delegate for each 100 members. A communication was presented relative to the proposed Procter Memorial, and was referred to the Committee on President's Address.

W. L. Cliffe, Chairman of the Committee on Legislation, reported the failure to secure the desired legislation, as having been caused to some extent at least by the antagonism felt by many of the legislators to the State Pharmaceutical Examining Board. He reported the passage of an act repealing the re-registration clause of the pharmacy law, and increasing the fees for registration after examination.

A number of reports were received from various local associations, indicating increased prosperity from organization. Mr. Pritchard, of the Western Pennsylvania Retail Association, stated that the conditions in his Association at the present time were more favorable than he had ever known them.

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[1] Credit is due to Dr. J. A. Miller, F. W. E. Stedem and Prof. C. B. Lowe for courtesies in the preparation of this report.

The Committee on Trade Interests reported that chairmen had been appointed for each county in the State, and that an effort had been made to secure the organization of county societies to be affiliated with the Pennsylvania Association. At the present time there are some thirty local societies in the State. Reports were received from the Committee on Adulterations, by Mr. LaWall, the Committee on Membership, by Mr. Bransom, the Committee on Chemistry, by Prof. Moerk, and the Committee on Botany, by Prof. Kraemer.

The Committee on Free Dispensaries reported through Prof. Remington that a meeting of the joint committee of this Association and the State Medical Association had been held. They recommended that a law be passed requiring the keeping in each dispensary of a register in which all recipients of medicine shall be required to *sign* their names and residences, with penalties attached for imposing upon the hospital authorities. The recommendation was agreed to, and the Secretary ordered to send a copy of this action to the Secretary of the State Medical Society, and to our delegates to that society.

The reports of the delegates to the different State and National Associations were then presented.

An order was directed to be drawn upon the Treasurer for the amount of $50 in favor of the Committee on Legislation, and the thanks of the Association were ordered to be presented to the Philadelphia Retail Druggists' Association for their hearty financial support to secure the needed legislation. Mr. Cliffe reported that the committee to secure a portrait of the late Chas. A. Heinitsh had been quite successful, and that an excellent portrait had been hung in the Museum of the Philadelphia College of Pharmacy.

The following officers were elected for the ensuing year: President, W. L. Cliffe, Philadelphia; First Vice-President, W. F. Horn, Carlisle; Second Vice-President, Isaac M. Weills, Washington; Secretary, Dr. J. A. Miller, Harrisburg; Treasurer, J. L. Lemberger, Lebanon. Executive Committee, Wm. O. Frailey, Lancaster; J. H. Stein, Reading, and E. E. Heck, Pittsburg. Local Secretary, H. J. Mentzer, Waynesboro.

The next meeting will be held at Buena Vista Springs Hotel.

The following is a list of the papers read:

"The Aniseed Oils and Anethol." By George R. Pancoast, M.D., and Lyman F. Kebler. (See this Journal, p. 356.)

"Method for Determining the Value of Chromic Acid and the Soluble Chromates." By Lyman F. Kebler. (See this JOURNAL, 395.)

"Cold Cream." Theodore Campbell submitted the following formula which is somewhat similar to one devised by W. C. Alpers and published in this JOURNAL, 1901, p. 117.

Spermaceti, 125 grammes; White Wax, 120 grammes; Mineral Oil, 600 c.c.; Stronger Rose Water, 190 c.c.; Borax, 5 grammes; Oil of Rose, gtt. 5.

Cut wax and spermaceti in small pieces, add oil, apply gentle heat, to about 140° F. Dissolve borax in rose water, apply gentle heat, same temperature as wax and oil.

Add aq. rose and borax, previously heated, to the oil and waxes, without stirring and then stir rapidly and continuously until mixture becomes uniformly soft and creamy. When cool, add oil of rose.

"Oleate of Mercury." F. W. E. Stedem states that this oleate may be preserved by the use of petroleum jelly. The oleate is made as directed by the U.S.P., using but 75 per cent. of oleic acid and after the solution is complete, 25 per cent. of white petroleum jelly is added.

"Tabulation of 1,000 Prescriptions." By C. H. LaWall and M. W. Bamford.

"The Analysis of 1,000 Prescriptions." By S. Reed Hassinger.

"Toxins and Antitoxins." Prof. C. B. Lowe gave a popular talk on this subject.

"Native Drugs." By Isaac M. Weills. The author gives an account of the medicinal plants gathered almost entirely on his own grounds in Washington, Pa., samples of which he exhibited in connection with the paper.

"The Deterioration of Artificial Foods." By Charles H. LaWall. This will appear in a later issue of this JOURNAL.

"Laboratory Notes." By Robert C. Pursel and Willard R. Graham. These will be published in a later issue of this JOURNAL.

F. T. Gordon presented notes on the following:

"Wood Alcohol in the Preparation of Narcotic Fluid Extracts." The author made preparations of aconite, belladonna, cannabis indica, capsicum, conium, digitalis, nux vomica, hyoscyamus, stramonium and veratrum viride and found the fluid and solid extracts made with both methyl and wood alcohol to be practically

the same as the U.S.P. in regard to strength of active principle. (See Scoville, *Amer. Drug.*, September 11, 1890.)

"The Use of Wood Alcohol in the Preparation of Tincture of Iodine." The author concludes that it is unfit to be used unless a strong counter-irritant is desired and even then it should be used with caution. (See AMER. JOUR. PHARM., 1901, p. 285.)

The author says no substances will successfully counteract the odor of wood alcohol, but that the addition of more odorous substances (what ?) will mask the peculiar odor to some extent.

The commercial precipitated phosphate of calcium contains usually a small amount of calcium sulphate; one sample contained as much as 20 per cent. The presence of arsenic was ascertained in samples.

The aconite root of the market appears to be contaminated in a number of instances with roots of other species of aconitum, horseradish, and inferior aconite.

Commercial phosphate of soda does not respond to U.S.P. tests for arsenic, but two samples showed traces of arsenic by the method of Dozzard and Cody (see also E. H. Gane in *Amer. Drug.*, 1900, p. 101).

Acetic acid as a menstruum may be used in the preparation of extract of gentian and ipecac. (See Squibb, *Amer. Jour. Pharm.*, 1899, pp. 1 and 305; 1900, pp. 1 and 311.) The author does not see any necessity for change of name in fluid or solid extracts made with acetic acid.

Collodion of the U.S.P. varies in consistency depending upon the gun cotton. One manufacturer allows the collodion to stand six months after preparation before selling it. He also uses a slightly greater proportion of alcohol.

A process of assay of veratrum album is given, being a modification of method given by Lyons, acetic acid being used in the extraction.

"Note on Commercial Lard." (See Bamford, AMER. JOUR. PHARM., 1901, p. 29.)

The red coloration in carbolic acid appears to be due, as already pointed out by Walter (*Pharmaz. Jour.*, "Progress in Pharmacy and Therapeutics," Lehn and Fink, Feb., 1900, p. 55), to the action of ozone or hydrogen peroxide and traces of iron, contained in the container or acid itself. This is confirmed by the author.

"Vanillin." The author gives tests and method of estimation.

"Powdered Drugs." The author points out that if the manufacturer can establish a standard of assay for commercial reasons, the Pharmacopœia can certainly do as much for higher reasons.

"Assay of Cinchona Bark." The author recommends the process of Dr. Caspar (Lyon's "Drug Assaying,") estimating the quinine in total alkaloids.

"Laboratory Notes." The author offers some practical suggestions for making and keeping such notes.

"Powdered Drugs." F. W. E. Stedem states that he has found it impossible to produce a No. 60 power of aconite root without at the same time reducing the outside cortical layer to a very fine powder.

"The Prime Cause of Failure in Passing State Board of Pharmacy Examinations." Louis Emanuel stated that one of the causes was that many applicants were incompetent and that some of the leading colleges were lax in their graduation requirements.

"State Pharmaceutical Examining Board." Louis Emanuel presented a statement of facts concerning the activity of the Board as shown during the past year. This paper was referred to a committee who reported subsequently that the "Association pledges to the Pharmacy Board its most cordial support in its efforts to enforce properly the laws of this Commonwealth, but it distinctly condemns the methods that have been employed by the Board."

"Minor Surgery." By Dr. B. Franklin Stahl. After defining this division of surgery as given in the "American Text-Book of Surgery," the author states that the druggist is not qualified to attend to such work and should not be taught minor surgery. He, however, states that every well informed citizen should know what to do in an emergency threatening life or physical well-being.

"Applied Therapeutics for Pharmacists." D. J. Thomas is of the opinion that a course in applied therapeutics would be of advantage to graduates in pharmacy.

In a paper on "Is Alcohol a Stimulant or an Anæsthetic," D. J. Thomas endeavors to show that ethyl alcohol is an anæsthetic.

H. F. Ruhl presented a paper on "Advertising for the Pharmacist," and W. M. Chalfant gave one on "Does Advertising Pay."

"Worcester Plan." Charles Leedom presented a paper on this plan for the restoration of prices.

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OCTOBER, 1901.

CALCIUM OXALATE CRYSTALS IN THE STUDY OF VEGETABLE DRUGS.[1]

BY HENRY KRAEMER.

The value of the study of reserve starch grains in determining the origin of certain vegetable foods and drugs has been recognized for a number of years. It is, however, becoming more evident that the starch grains which we recognize as typical and say are characteristic of certain products occur in a relatively small proportion to the whole number of grains, *i. e.* the spherical and ellipsoidal starch grains occur in all starchy products no matter what their origin may be and the so-called characteristic grains (as the angular grain in corn, or the excentric grain with characteristic point of growth and lamellæ in maranta, potato, calumba, etc.), are by no means so numerous as is commonly supposed. So that, for instance, an examination of wheat-flour[2] which has been admixed with say, from 5 to 10 per cent. of corn meal, reveals in a microscopical mount of a milligramme of the material but two or three typical corn starch grains; and even though the admixture is about 25 per cent. only about seven typical grains will be found.

On the other hand calcium oxalate occurs in crystals of definite form and size in a large number of drugs and in only a comparatively few instances is there a distinct variation in the type, as for instance in *Datura stramonium* L.[3]

[1] Presented at the St. Louis meeting of the American Pharmaceutical Association, September, 1901.

[2] Kraemer, *Jour. Am. Chem. Soc.*, 1899, p. 650.

[3] Kraemer in *Proc. A. A. A. S.*, 1899, p. 305.

R. von Wettstein in a study of the Umbelliferæ has shown that the presence and distribution of calcium oxalate crystals are important factors in systematic work, at least in this family, and my own studies of the Solanaceæ also tend to confirm this view. It may also be noted that soil conditions do not seem to influence the amount of this salt, *i. e.* a plant growing in silicious soil will contain about the same amount as one growing in calcareous soil. I have, however, already referred to the fact that when fungi[1] are growing on plants there is likely to be a decrease in the number of calcium oxalate crystals usually present.

Calcium oxalate occurs in plants in either the monoclinic or tetragonal system. The crystals of the monoclinic system are rather widely distributed and consist of $Ca\ C_2O_4 + 3$ to 6 molecules of H_2O; while those of the tetragonal system occur less frequently and the salt has the formula $Ca\ C_2O_4 + 1$ to 2 molecules of water. It is rather interesting to note that while both forms of crystals may be obtained in even the same solution artificially, that in nature the one form or the other is constant for the species. Various explanations have been offered showing under what conditions the two forms of crystals arise. Haushoper states that the tetragonal crystals are formed in a neutral or alkaline solution, whereas the monoclinic crystals require an acid solution for their formation. Kny believes that when there is more calcium in proportion to the oxalic acid, tetragonal crystals are formed, but when the proportions are reversed then crystals of the monoclinic system arise. The observations of Kohl tend to confirm the studies of Kny.

While calcium oxalate crystallizes in these two systems, it is highly probable that but one of these systems is represented by our vegetable drugs, viz., the monoclinic system, which includes a number of forms as follows:

(1) Rosette aggregates, or what are commonly termed rosette-shaped crystals.

(2) Prisms, pyramids and elongated or irregular hexagonal-shaped crystals.

(3) Crystal-fibers.

(4) Raphides.

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[1] Kraemer in *Proc. A. Ph. A.*, 1898, p. 297.

(5) Cryptocrystalline crystals.

(6) Membrane crystals.

1. *Rosette Aggregates* consist of numerous small prisms and pyramids or hemihedral crystals more or less regularly arranged on a central crystal and having the appearance of a rosette or star. The development of this form may be readily followed in the stem of *Datura stramonium* L. This form is more largely represented in our drugs than any other form and the following is a list of the pharmacopœial drugs in which the crystals of this class are contained, together with the size of the crystals :

Althæa, 25 microns.
Anisum, 2-3 microns.
Belladonnæ folia, occasionally.
Buchu, 15-25 microns.
Calendula, 4 microns.
Cannabis indica, about 20 microns.
Carum, 0.5-1.0 microns.
Caryophyllus, 10–15 microns.
Chimaphila, 40–60 microns.
Conium, 1–2 microns.
Coriandrum, 3–7 microns.
Cusso, about 20 microns.
Eriodictyon, 20–25 microns.
Euonymus, 15–20 microns.
Foeniculum, 1–2 microns.
[1] Frangula, 5–20 microns.
Geranium, 45–70 microns.
Gossypii radicis cortex, about 20 microns
[1] Granatum, about 15 microns.
Humulus, 10–15 microns.
Jalapa, 30–35 microns.
Pilocarpus, 20–30 microns.
Pimenta, 10 micron ; occasionally 25 microns.
Prunus Virginiana, 20–30 microns.
Quercus alba, 10–20 microns.
[1] Rhamnus purshiana, 5–20 microns.
Rheum, 50–100 microns.
Rubus, 25–30 microns.
Stillingia, about 35 microns.
Viburnum opulus, occasionally.
Viburnum prunifolium, 15–35 microns.

2. *Monoclinic Prisms and Pyramids.*—Next to the rosette aggregates the prisms and pyramids occur in the greatest number of

[1] In these drugs prisms and pyramids in group No. 2 also occur.

pharmacopœial drugs. These frequently are so modified in form that they are of an elongated or irregular hexagonal shape. The crystals of this group are sometimes mistaken for silicon[1]. Owing to the fact that the lumen of the cell in some instances is completely filled by the crystal and the inner wall having the contour of the crystal, it is impossible by simply using hydrochloric acid to determine whether the crystal has been dissolved or not. This group of crystals is found in the following drugs and in the sizes given:

Calumba, about 15 microns in stone cells.
Cardamomum, 10–25 microns.
Coca, 3–10 microns.
Eucalyptus, 15–25 microns.
Frangula, 5–20 microns.
Gelsemium, 15–30 microns.
[2] Granatum, about 15 microns.
Hamamelis, 7–20 microns.
Hyoscyamus, about 10 microns; single or in twin crystals.
Krameria, about 100 microns.
[2] Pimenta, occasionally.
Prunus Virginiana, 20–30 microns.
[3] Quassia, about 25 microns.
[2] Quercus alba, 10–20 microns.
Quillaja, 35–200 microns.
Rhamnus purshiana, 5–20 microns.
Senna, 10–20 microns.
Uva Ursi, 7–10 microns.
Vanilla, 7–35 microns.
[2] Viburnum opulus, 15–30 micron.
[2] Viburnum prunifolium, occasionally.
Xanthoxylum, 10–25 microns.

3. *Crystal Fibers.*—In quite a number of drugs a single monoclinic prism occurs in each of the parenchyma cells, adjoining the schlerenchyma fibers, and to this single longitudinal row of superimposed cells the name crystal fiber has been applied. They occur in the following drugs, the size of the individual crystals also being given:

Calamus, about 15 microns.
Frangula, 5–20 microns.

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[1] Silicon never occurs as a cell content in sharp angular crystals, but occurs either in more or less elliptical or irregular hollow masses or in more or less solid irregularly branching masses.

[2] Rosette aggregates are also present in these drugs.

[3] Cryptocrystalline crystals also occur.

Glycyrrhiza, 15–20 microns.
Hamamelis, 7–20 microns.
Hæmatoxylon, 10–15 microns.
Prunus Virginiana, 20–30 microns.
Quercus alba, 10–20 microns.
Quillaja, about 35 microns.
Rhamnus purshiana, 5–20 microns.
Santalum rubrum, 7–15 microns.
Ulmus, 10–25 microns.
Uva Ursi, 7–10 microns.

4. *Raphides* was the name given by A. de Candolle (1826) to the groups of needle-shaped crystals found in various plants. These have been mistaken by several observers for calcium phosphate.[1] Usually the cells containing raphides are long, thin-walled and contain sooner or later a mucilage,[2] which arises from the cell sap and behaves with reagents much like cherry-gum. The cells are either isolated or occur in groups placed end to end, as in Veratrum viride, forming Hanstein's "Raphidenfuhrenden Schlauchgefässe." Raphides are found in the following drugs, and of the length given with each:

[3] Belladonnæ folia, occasionally.
Cinnamomum, about 5 microns.
Convallaria, about 45 microns.
Cypripedium, about 40 microns.
Ipecacuanha, 20–40 microns.
[3] Phytolaccæ radix, about 30 microns.
Sarsaparilla, 6–8 microns.
Scilla, 0·1 to 1·0 mm.
Vanilla, about 400 microns.
Veratrum viride, about 45 microns.

5. Cryptocrystalline crystals of calcium oxalate are exceedingly small (about ·2 to 10 microns in diameter) deltoid or arrow-shaped, and are so numerous as to entirely fill the parenchyma cells in which they occur, giving the cells a grayish-black appearance and readily distinguishing them from other plant cells. Vesque supposed that they were tetrahedrons and termed them "Sable Tetraé-

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[1] Calcium phosphate is apparently seldom found in plants except either in solution or in combination with protein substance.

[2] Kraemer im *Am. Jour. Pharm.*, 1898, 225.

[3] Cryptocrystalline crystals also occur.

drique." My own investigations tend rather to the opinion that they are in the nature of hemihedral forms of monoclinic crystals. This view is strengthened by the fact that monoclinic prisms occur in neighboring cells in the same plant as in *Datura stramonium* L., Quassia, etc. Cryptocrystalline crystals are found in the following drugs:

Belladonnæ folia.
Belladonnæ radix.
Cinchona.
Phytolaccæ radix.
Quassia.

6. MEMBRANE CRYSTALS.—There are several forms of crystals which may be included in this group. The so-called Rosanoff crystals[1] consist of rosette aggregates attached to inward protruding walls of the plant cell. These, however, do not concern us so much as the large monoclinic crystals which have a membrane (called by Payen "tissu special") surrounding them. The crystal first appears in the cell-sap and then, in the protoplasm around the crystal, numerous oil globules appear; later some of the walls of the cell thicken and grow around the crystal which they finally completely envelop. Crystals of this character and of the sizes given, are found in the following drugs:

Aurantii amari cortex, 15–20 microns.
Aurantii dulcis cortex, 20–30 microns.

CARBOHYDRATE CRYSTALS.

While calcium oxalate crystals have been mistaken for crystalline sugars, it should also be pointed out that some of the more or less soluble carbohydrates, as hesperidin and inulin, may be mistaken for calcium oxalate. They occur in either sphere-crystals or irregular spherical aggregates which are more or less easily soluble in water. They are found in buchu, hedeoma, inula, lappa, pyrethrum, taraxacum and triticum.

DRUGS WITH LITTLE OR NO CALCIUM OXALATE.

In the following drugs calcium oxalate crystals are either wanting entirely or so few as to be without any diagnostic value: Aconitum, apocynum, arnicæ flores, capsicum, chirata, cimicifuga, colchici

[1] Rosanoff, in *Bot. Zeit.*, 1865, p. 329.

cormis, colchici semen, colocynthus, cubeba, digitalis, eupatorium, gentiana, grindelia, hydrastis, lappa, leptandra, linum, lobelia, marrubium, mentha piperita, mentha viridis, mezereum, myristica, nux vomica, pareira, physostigma, piper, podophyllum, rhus glabra, rosa gallica, sabina, sanguinaria, santonica, sassafras, senega, serpentaria, sinapis alba, sinipis nigra, spigelia, staphisagria, strophanthus, sumbul, valerian and zingiber.

CONCLUSION.

The value of the study of the characteristic form, or absence of calcium oxalate crystals, is at once apparent when we consider the ease with which one can distinguish without question the Solanaceous leaves, horny belladonna root from inula, the genuine cinnamons, strophanthus seeds, and other drugs from those that are spurious; as also true spigelia from an adulterant which contains calcium carbonate. Examples requiring verification of this kind are continually coming up in not only the determination of powdered drugs, but crude drugs as well.

THE DETERIORATION OF ARTIFICIAL FOODS.

By Charles H. LaWall.

The deterioration or change which so often takes place in artificial foods, is a subject which is of vital importance, not only to the manufacturer who prepares the food and puts it upon the market, but also to the consumer who purchases it.

The druggist who keeps it in stock is an interested party as well as the physician who recommends its use.

In view of the fact that there are so many persons concerned in the matter, it is strange that little or nothing has been published relative to a matter of such widespread importance, but the fact remains that all of the literature on the subject is fragmentary and confined almost exclusively to technical works with which the average pharmacist or physician is unfamiliar.

The following paper is offered with the hope that a proper understanding of the principles involved will result in the instituting of such precautionary measures as will be found necessary to prevent the likelihood of possibility of such change taking place.

To intelligently comprehend the subject, some consideration

must be given primarily to the ingredients and constituents of the various artificial foods.

The constituents taken collectively may be divided into three general classes, *i. e.*:

(1) Fats.

(2) Proteids.

(3) Carbohydrates.

These may be still further subdivided according to their origin, whether it be animal or vegetable; the carbohydrates may be soluble or insoluble, that is, they may consist of sugars or dextrins, or they may belong to the group of starches.

The ingredients furnishing these constituents may be of the following:

Dried milk, flours or ground cereals, sugars or dextrins, starches, desiccated eggs or meat extracts.

The deterioration may be due to chemical changes involving one or more of these constituents or may be due to physical alterations brought about in one of several ways.

The principal causes involving chemical change may be divided into three classes, *i. e.*

(1) Oxidation of the fatty matter, resulting in what is commonly known as rancidity.

(2) Fermentative changes, which generally affect the carbohydrates.

(3) Putrefactive changes, which involve the proteid or albuminous matter.

The oxidation of the fatty matter is the only one of these changes that can possibly take place in the dry product, as both putrefaction and fermentation require the presence of a certain amount of moisture for their accomplishment.

This oxidation as it is called may be of bacterial origin, or it may be due simply to the action of the oxygen in the atmosphere. The latter supposition is borne out by the fact that this change occurs in dry material (or material containing less than 5 per cent. of moisture), is favored by access of air and retarded by protection from the atmosphere.

"Thorpe's Dictionary of Chemistry" says concerning the stability of fixed oils and fats: "If air be excluded the fixed oils may be preserved unchanged for a lengthened period; when absolutely

free from foreign matter most of them remain unchanged, but commercial specimens gradually turn rancid. This alteration is generally attributed to the presence of certain foreign matters, such as the cellular substance of the animal or plant from which the oil was extracted; volatile fatty acids are set free. Max Grager considers that rancidity is due to the oxidation of fatty acids and glycerin in presence of traces of water."

Decomposition of this kind is favored by continued exposure to high temperature, such as being placed on a shelf which adjoins a chimney flue.

Fermentative changes and alterations produced by the agency of micro-organisms are of rare occurrence unless the product has become damp, either from being packed in containers which were not thoroughly dried, or by the absorption of moisture from being kept in a damp place, or the packages themselves becoming wet through accident. Where the container is air- and moisture-proof these latter causes are eliminated from consideration.

Mould growths will take place in the presence of 10 per cent. of moisture, while bacteria will not flourish in the presence of less than 50 per cent. of moisture except in the presence of sugars, when the limit is reached with 30 per cent. of moisture.

When fermentative changes have once set in it is difficult to retard their operation.

There are some species of bacteria that will flourish after having been subjected to a pressure of 600 atmospheres for twenty-four hours, and on the other hand many of them will thrive better in the absence of oxygen than when freely exposed to the air. Fermentative changes alter the nature of the product, but seldom evolve any products of a harmful nature.

It is the putrefactive changes which are most to be feared, for they involve the nitrogenous or proteid matter and often produce toxic substances such as ptomaines, or the so-called cadaver alkaloids.

The cases in which putrefactive changes have taken place are of rare occurrence, however, on account of the large amount of moisture necessary for their successful accomplishment. Then, too, such alterations are usually accompanied by the production of sulphuretted odorous compounds which give warning of the change which has occurred. The first step in putrefaction is the peptoniza-

tion of the albuminous matter, after which the liberation of volatile fatty acids and sulphuretted gases takes place and the production of the toxic principles or ptomaines is the last step in the series of changes which take place.

It therefore follows that, if air and moisture be excluded, food products will keep for an indefinite period and this has been borne out by experimental work performed by numerous investigators on the subject.

When the package is not air tight the product should always be kept in a cool dry place, as this is the safest way to minimize the chances of deterioration occurring.

Another change which often takes place in products of this kind is one which involves purely physical processes and which is applicable also to many other substances kept in the store, such as ground drugs and spices.

This change is produced by the absorption of odorous compounds and subsequent alteration of odor and flavor, either by the close proximity of some volatile body having a powerful odor, or by the standing in an atmosphere surcharged with such odorous compounds. It is a well known fact that most drug stores have a distinctive odor, usually of an unpleasant character, and at certain seasons of the year, when naphthalene, or "coal tar camphor" as it is termed, is in great demand, some druggists have window displays in which a large amount of the product is heaped up so as to attract attention. As this compound is very volatile and of a peculiar penetrating odor it can easily be seen that when the store is closed up for the night so that there is no ventilation to carry the odor out, every container in the store which is not practically airtight will be subjected to the influence of this vapor, and in such cases as the food products, ground spices and many of the ground drugs, enough of the odor is often absorbed to be readily appreciable to the senses for a long time afterward. A retail druggist some time ago was questioned on this subject and in reply said that he had learned this fact after losing two customers who had bought ground spices from him after he had been having a window display of flake naphthalene, and that he now handled the substance only in sealed cartons, and had also taken the trouble to rearrange his drawer stock so that the strongly odorous substances like asafœtida, camphor, etc., were kept away from such substances as ground elm bark, ground spices, etc.

There is not a single druggist in the business to-day who does not know these facts perfectly well, but many are careless about putting their theoretical knowledge to practical use, and it is only with a view of reminding them of the possible consequences of inattention to such details, that the foregoing paper is offered.

RECENT LITERATURE RELATING TO PHARMACY.

ASSAY OF PHOSPHORUS IN OILS.

After trying all suggested methods the following was found most satisfactory.

Thirty c.c. oil is treated with three times its volume of ether and to the solution 8 to 12 c.c. of a 10 per cent. alcoholic solution silver nitrate is added and the mixture well shaken. The precipitate is thrown on an asbestos filter, washed with ether, transferred to a flask. After dissipation of the adhering ether, by warming in vacuo, a mixture consisting of 10 c.c. concentrated nitric acid, 10 c.c. concentrated sulphuric acid and 10 c.c. water is added to the residue and the mixture allowed to stand an hour. It is then gently warmed until red-brown vapors cease, filtered, precipitated with ammonium molybdate, precipitate dissolved in ammonia water and finally assayed for phosphates by the usual magnesia-mixture method. Practising on known quantities of phosphorus, the yield was 90 per cent. of the theoretical.—(Dr. H. Franckel, *Ph. Post*, 1901, 117). H. V. ARNY.

ANATOMICAL COMPARISON OF BERBERIS BARKS.

After lengthy histological description of the bark of *Berberis aristata*, with comparisons to the bark of other species of Berberis, W. Mitlacher (*Ph. Post*, 1901, 129), finds but slight differences in their anatomy. *Berberis vulgaris* and *B. aquifolium* have more pronounced sclerotization of the medullary rays than has *B. aristata*. In the barks of both *B. aristata* and *B. aquifolium*, hard bast is lacking in the phloem; thus distinguishing these two from *B. vulgaris*.

The most prominent marks of distinction of *B. aristata* are; preponderance of sieve tubes over parenchyma in the soft bast; presence of crystals of calcium oxalate in the medullary rays, their quantity being in direct proportion to the amount of sclerotization of the same tissue; extreme breadth of medullary rays; absence of interfascicular wood. H. V. A.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The forty-ninth annual meeting was held in St. Louis, September 16–21. At the first general meeting held on Monday afternoon, September 16, the President, John F. Patton, delivered the annual address. It was devoted to the consideration of the notable achievements of the last century in pharmacy, the progress in chemistry and its application to other branches of science. The lives and works of Dr. Rice, Dr. Squibb, and Hans M. Wilder were briefly referred to. Some of the problems in educational work were considered and Mr. Patton said that the hope of bettering the conditions for the pharmacist lies in bettering the individual. The effective work of the committee on national legislation was commented upon and the speaker in conclusion referred to the proposed Procter memorial and suggested that a Procter memorial medal be bestowed by the Association.

An interesting feature of this session was the reading of a letter from Prof. A. B. Prescott, who is visiting in London and who referred to his cordial reception at the recent meeting of the British Pharmaceutical Conference in Dublin.

At the second general session the following officers were elected: President, H. M. Whelpley; Vice-Presidents, W. M. Searby, George F. Payne and W. S. Thompson[1]; General Secretary, Charles Caspari, Jr.; Treasurer, S. A. D. Sheppard; Reporter on Progress of Pharmacy, C. Lewis Diehl. W. L. Cliffe was elected Local Secretary at a subsequent meeting of the Council. The time and place of meeting for 1902 is Philadelphia not earlier than September first. It was proposed, inasmuch as this is to be the semi-centennial anniversary of the Association, that Dr. Fr. Hoffmann, Berlin, be asked to preside at a special session and deliver an address on that occasion. The number of applicants for membership reported at this meeting was nearly 150. The remainder of this session was devoted to the consideration of the reports of officers and standing committees. The Secretary, Charles Caspari, Jr., in addition to his usual report, stated that the receipts from the sale of the National Formulary since its inception was something over

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[1] William S. Thompson died very suddenly of angina pectoris on September 26th, at his home in Washington, D. C. He had not only rendered valuable service in the American Pharmaceutical Association, but was also Chairman of the Board of Trustees of the U. S. Pharmacopœial Convention.

$12,000, and that there was a profit to the Association of over $4,000. The chairman of the Committee on Membership, George W. Kennedy, reported that 102, or about 82 per cent., of the members proposed at the Richmond meeting had completed their membership. In addition an eloquent tribute was paid to the memories of Dr. Rice and Dr. Squibb. The treasurer, S. A. D. Sheppard, reported that the cash received during the year amounted to $8,595.40 and that the cash to new account was $1,379.52. C. Lewis Diehl, Reporter on Progress of Pharmacy, presented his usual report. The Committee on Credentials gave a report through its chairman, William M. Searby. The chairman of the Committee on National Legislation, Albert E. Ebert, reported the work that had been done by the committee, in coöperation with other organizations, in the successful repeal of the Stamp Tax and then moved that a permanent committee consisting of three members, one of whom should be located in Washington, and to which all matters relating to national legislation shall be referred, be appointed. The chairman of the Special Committee on Weights and Measures, Frank G. Ryan, reported that:

"During the past year some definite progress has been made toward the adoption of the metric system in the various departments of our Government. Although the final result is by no means certain another step in the right direction has been taken. The Committee on Coinage, Weights and Measures of the House of Representatives through its chairman, Mr. Southard, reported the following bill with a favorable recommendation on March 1, 1901:

"A BILL

"To adopt the weights and measures of the metric system as the standard weights and measures in the United States.

"*Be it Enacted*, By the Senate and House of Representatives of the United States of America in Congress assembled, That on and after the first day of January, nineteen hundred and three, all the Departments of the Government of the United States, in the transaction of all business requiring the use of weight and measurement, except in completing the survey of public lands, shall employ and use only the weights and measures of the metric system; on and after the first day of January, nineteen hundred and three, the weights and measures of the metric system shall be the legal standard weights and measures of and in the United States."

This bill was committed to the Committee of the Whole House on the state of the Union, and ordered to be printed. It is hoped

that it may receive consideration at the coming session of the 57th Congress.

Owing to the many changes in the membership of the House of Representatives it will be necessary to acquaint a large number of new members with the advantages to be gained by the adoption of this measure and your committee would request the active support of the individual members of this Association in an effort to convince their Representatives in Congress of the desirability of the adoption of the metric system.

Although the growth of the use of the metric system by physicians is not as rapid as we would wish, its adoption in manufacturing enterprises is certainly encouraging. While our Government at Washington has taken about thirty-four years to think the subject over, our practical business men are likely to settle the question in many lines of trade by adopting metric measurement for carrying on foreign business transactions.

The expanding foreign commerce of our country will have an important bearing upon the final outcome of the question. The advocates of the metric system have now the support of nearly all of the trade press and many of the leading daily papers actively advocate its adoption.

It is not to be supposed that the millions of dollars invested in intricate machinery is to be lost by discarding the latter and replacing with new models built on metric measurements, but a gradual change can be made and this as rapidly as demands will warrant. Probably no form of occupation using weights and measures could make the complete change with less expense than those of medicine and pharmacy. It is perfectly obvious that pharmacists can never wholly discard old systems of weights and measures until such time as physicians shall entirely abandon their use. As we have before advocated it will be necessary for our medical colleges to teach their students only in terms of the metric system, and in a comparatively brief period the change from the old to the new can be accomplished in so far as our occupation is directly concerned.

Appended to this report was submitted the complete report of the Committee of the House of Representatives which includes the bibliography of the documents presented to Congress from the year 1790 to 1896, which was recommended to the Publication Committee of this Association for printing in the proceedings.

At the third general session on Wednesday morning Joseph P. Remington, chairman of the Committee on Exhibits, presided. The entire session was devoted to short talks by those having exhibits at the meeting or their representatives. One of the most interesting exhibits was a collection of Pharmacopœias from the S. A. D. Sheppard Library of the Massachusetts College of Pharmacy. This collection consists of 275 pharmacopœias which were collected by Mr. Sheppard, in which he was assisted by the late Charles Rice and which he donated to the Massachusetts College of Pharmacy.

C. S. N. Hallberg had an exhibit of cerates, ointments, plasters and oleates representing the results of the experiments of the sub-committee on the Revision of the U.S.P., of which he is chairman. The exhibit from the Philadelphia College of Pharmacy consisted of valuable historical manuscripts and books, among which were the original notes on the Revision of the U.S.P., by the late William Procter, Jr. Albert Schneider exhibited a number of pen and ink drawings of the important characteristics of powdered vegetable drugs.

The exhibits of some of the manufacturing houses were most instructive. Parke Davis & Co. exhibited adrenalin, F. G. Ryan describing its mode of preparation and uses. Smith, Kline & French Co. had an exhibit of adulterated drugs which formed the basis of a paper by Lyman F. Kebler, which was read in abstract in the Scientific Section. The exhibit of Rosengarten & Sons was devoted to specimens of cinchona barks and the alkaloids obtained therefrom. Sharpe & Dohme had an extensive exhibit of the various pharmaceutical preparations manufactured by this firm. Merck & Co. exhibited a complete line of the chemicals which they manufacture and which elicited a great amount of attention not only on account of the variety of products but also on account of the quantities exhibited. E. R. Squibb & Sons had an exhibit of preparations in which acetic acid was used as a menstruum. The exhibit of the William S. Merrell Chemical Co. embraced a collection of the derivatives of hydrastis and oil of gaultheria. There were a number of other interesting exhibits.

SCIENTIFIC SECTION.

In order to allow those who desired to attend the memoria services in honor of President McKinley on Thursday afternoon, the work of the section was limited to two sessions; and notwith-

standing this reduction in time and the fact that the Section on Practical Pharmacy and Dispensing held a simultaneous meeting on Friday morning, the work of the section was eminently successful, the number of papers considered being more than usual. The chairman, Oscar Oldberg, delivered the annual address which we publish nearly in full.

Scientific medicine can accomplish little or nothing without the aid of scientific pharmacy. The recognition of this truth is not as pronounced and general as it might be; but, feeble as it is, it accounts for the Scientific Section of the American Pharmaceutical Association. Signs of scientific activity in American pharmacy are by no means wanting. The American Pharmacopœia is scientific and technical to a degree which gives it high rank among the pharmacopœias of the world. None of them are perfect; but the unscientific features seen in them are being gradually eliminated. The progress in medicine is rapid. The progress in pharmacy must keep pace with it. New remedies are discovered almost daily. These must be studied, analyzed, described; and means provided for their identification and examination. All of this work must be done by scientifically trained specialists—the pharmacists.

The Pharmacopœia must be understood and obeyed. It can be fully understood only by pharmacists of proper scientific-technical education. We all subscribe to the principle that the training of the pharmacist must not fall below that which is necessary to an intelligent interpretation and application of the text of the Pharmacopœia, and that as the Pharmacopœia is improved, pharmacy and pharmacists must improve with it.

The only truly practical pharmacist is the educated pharmacist. If the papers read before this Section of the American Pharmaceutical Association may be taken as a reliable index of the scientific progress of American pharmacy we would have little cause for regret. But these papers do not indicate what proportion of the pharmacists of our country are actually doing their work in a scientific manner.

During the past ten years 218 papers were read before the Scientific Section of this Association. Of these 218 papers 165 came from the pharmaceutical schools, twenty-two from the laboratories of manufacturing pharmacists, and thirty-one from other sources. Not all of the thirty-one others were practicing pharmacists. It is quite natural that a large proportion of the scientific papers read here should come from the schools and from the laboratories of manufacturers. We have a right to expect it of them. But may we not expect more than thirty papers in ten years from the practicing pharmacists of this great and progressive country? I believe that the technical knowledge and training of the members of this Association ought to bear more abundant fruit in the Scientific Section.

This Section is vitally concerned in the question of pharmaceutical education and legislation. If we do not sow the seed and diligently cultivate the ground, neither can we reap.

The most direct, simple and rational method of ascertaining whether or not a man has really prepared himself in any serious way for the responsible duties of pharmacy is to require him to state specifically what he has done in that

direction. Then, if his categorical answers show that he has actually done enough to justify the hope that he may possibly know enough to be recognized as a pharmacist, give him an examination. But the Boards of Pharmacy never ask a candidate whether or not he has ever pursued any course of study, or received any instruction, or done any work along the lines upon which the examination is conducted. They do ask the candidate if he has attended or graduated from any college of pharmacy. If he answers "yes" then they feel in duty bound to punish him with a more perplexing examination. If he says "no," then they give him a milder examination; but they never refuse to examine a candidate who may be obliged to confess beforehand that he never studied chemistry, or materia medica, or pharmacy in all his life. You might think that their object is to effectually convince the young man he ought not to insult the examiners by asking for an examination upon matters about which he ought to know that he is totally ignorant; but many of these candidates pass, become registered pharmacists, and are later called upon by the energetic friends of the American Pharmaceutical Association and invited to become members of this body.

Let us think. Is it any wonder that such men refuse to join our Association? Or that they join one year and drop out the next year? Or that they do not participate actively in our work if they do become members?

At its last annual meeting the American Pharmaceutical Association, to its everlasting credit, adopted, without a dissenting vote, a draft of a "model pharmacy law" the most important feature of which was the requirement that no person should hereafter be admitted to the rank of a registered pharmacist unless he has graduated from a pharmaceutical school. Will not the Association now go one step further and fix some kind of an educational qualification or standard of technical training for membership. We cannot consistently do less. Let us remember that the old membership which has made this Association what it is must pass away. Let us provide for the future of our dearly beloved Association by seeing to it that its coming membership shall be such as to preserve and improve it.

The strenuous method of increasing our membership in numbers is perhaps a good thing for the new members as well as for the present needs of our treasury; but let us henceforth particularly strive to enlist into our ranks as many as possible of the men who may increase the usefulness, influence and good name of our Association in the scientific direction.

Then will we have more than thirty papers in ten years from those of our members who are not engaged in teaching or in manufacturing.

I may not attempt any review of important discoveries during the past year in the sciences most intimately related to pharmacy. It is, in the nature of things, forbidden the Chairman of this Section. Yet I may be pardoned for calling your attention to the possible if not probable solution of one of the mooted questions which has puzzled the student of chemistry during recent years. The gaseous elements recently discovered in the atmosphere, for which, it was said, no place could be found in the periodic system of classification, seem to fit into that system so perfectly as to add new evidence to the truth of the periodic law, for neon, argon, crypton and xenon would seem to form one family which belongs, as another 8th group, between the halogens and their antipodes, the alkali metals:

Fluorine 19	Neon 20	Sodium 23
Chlorine 35.5	Argon 39.9 (?)	Potassium 39
Bromine 80	Crypton 82	Rubidium 85.5
Iodine 126.5	Xenon 128	Cæsium 133

With a due sense of the feebleness of my right and fitness to discuss questions of theoretical chemistry in a critical attitude I ask your attention, further, to the inconsistencies of the molecular formula and weights used in our pharmaceutical and chemical works. If we subscribe to the theory that *molecules are the smallest particles into which any particular kind of matter can be divided without losing the specific properties which determine its individuality*, we shall have little difficulty in remedying a few of the inconsistencies referred to. Avogadro's law states that equal volumes of all gases contain an equal number of molecules; but it seems to me that no one substance can have more than one molecular weight. I leave it to the masters of chemistry to say whether the law of Avogadro ought not to be qualified so as to read to the effect that *equal volumes of all gases contain the same number of individual particles of matter* (not necessarily "molecules").

Our Pharmacopœia assigns to ferric chloride the old formula, Fe_2Cl_6, and a corresponding molecular weight, whereas modern recognized authorities on chemistry give the new formula $FeCl_3$. Particles of Fe_2Cl_6 exist in the state of vapor, and also particles of $FeCl_3$ at a higher temperature. Here the old formula is inconsistent, while the new one is consistent, with the theory of atomic linking. On the other hand our Pharmacopœia writes arsenous oxide As_2O_3 although, so far as I know, that compound has not yet been obtained in vapor of a density corresponding to that formula, but has been obtained of a vapor density corresponding to the formula As_4O_6.

May it not be profitable to adopt the rule that the molecular weight of any vaporizable compound must be twice the number indicating its *lowest* possible vapor density, and that the molecular formula must be consistent with the theory of atomic linking? This question is one of interest as well as importance.

The following papers were presented:

The So-called Pure Berberine of R. Gaze.

By H. M. Gordin and C. G. Merrell.

The authors have shown that the berberine of Gaze, which is formed by first forming an insoluble compound of berberine with acetone and then liberating the berberine from this compound by boiling with a mixture of alcohol and chloroform for twelve hours under a reflux condenser, is not free berberine but berberine hydrochloride, $C_{20}H_{17}NO_4HCl + 2H_2O$. This assumption at once clears

up the puzzling behavior of Gaze's berberine. It does not absorb carbon dioxide because it is not the free base but a salt of it. It does not take up any acid when it is taken up by acid and precipitated with potassium iodide or Wagner's or Mayer's reagent, because it simply interchanges its acid with the potassium iodide falling out as a hydriodide, leaving an equivalent amount of potassium chloride in solution. Silver nitrate reacting with the potassium chloride exactly as it does with potassium iodide does therefore not show any consumption of the latter salt.

The Alkaloids of Glaucium Flavum.

By R. Fischer.

The author isolated from this plant two alkaloids, protopine, identified by analysis, m. p., and crystallographic form, and another alkaloid, undoubtedly identical with the glaucine of *Probst*, although the latter investigator dealt with a very impure substance. Pure glaucine crystallizes from ethereal solutions in large, well defined crystals belonging to the rhombic system. It melts at 119°–120° and dissolves readily in alcohol, ether, chloroform, acetone and acetic ether; in water it is but slightly soluble. Glaucine is a very weak base. It is optically dextrorotatory $[L]_d$, being + 113.3 for approximately 5 per cent. solution. Its reactions with general alkaloidal reagents are very delicate and characteristic. The preparation of crystalline gold and platinum salts did not succeed on account of the strong reducing action of the base. A crystalline mercury salt, however, was obtained, melting at 130°–140°.

The empirical formula of glaucine was declared to be $C_{21}H_{25}NO_4$. The analyses of the hydrochlorate and hydrobromate, both well defined crystalline substances, corroborated these results. Glaucine is a tertiary base, containing four methoxyl groups. The substitution product, $C_{17}H_{13}(OH)_4NHI$, was obtained as a crystalline body and described.

The Alkaloids of Eschscholtzia Californica.

By R. Fischer.

Contrary to the results of *Bardet & Adrian* the author did not find any morphine in this drug. Instead, protopine, β homochelidonine and γ homochelidonine were identified by analyses as well as by m. p. and crystallographic measurements.

The Alkaloids of Sanguinaria Canadensis.

By R. Fischer.

The author separated the alkaloids of this drug, chelerythrine, sanguinarine, protopine and β and γ homochelidonine according to a new process. Chelerythrine ($C_{23}H_{23}NO_5$), which before had always been prepared containing one molecule of alcohol, was obtained by precipitating from acid solution with ammonia and dissolving the dried precipitate in toluol, as a crystalline body melting at 263°-264°, whereas the alcohol containing base melted at 203°. Since analyses of this body gave too high results in *N*, Na_2CO_3 was used as a precipitating agent. Crystals melting at 257° were obtained, which contained one-half molecule of toluol of crystallization, and upon analysis were found to correspond best with the formula $(C_{21}H_{17}NO_4)_2 . H_2O + C_6H_5CH_3$. The analysis of sanguinarine corresponded best with the formula of König, $C_{20}H_{15}NO_4 + \frac{1}{2}C_2H_5OH$.

Both β and γ homochelidonine were found in sanguinaria, differing in crystallographic form as well as in m. p. Upon closer investigation the author concludes that the two are undoubtedly physical isomers. Depending upon the precipitating agents employed, as well as upon the temperature, concentrations and nature of the solvent, either the one or the other of the two forms would be obtained. The change from the γ to the β homochelidonine was quantitatively accomplished. The reverse process was only partially successful. β homochelidonine melts at 159° and was never found to crystallize with alcohol of crystallization, γ homochelidonine melts at 169°. It sometimes crystallizes with, sometimes without alcohol and acetic ether of crystallization.

Does Argemone Mexicana Contain Morphine?

By Julius O. Schlotterbeck.

The author has found the alkaloids protopine and berberine, but no morphine.

Contribution to the Chemistry of Stylophorum Diphyllum.

By J. O. Schlotterbeck and H. C. Watkins.

The authors have isolated the alkaloids chelidonine, stylophine, protopine, diphylline and sanguinarine.

Separation of Cinchona Alkaloids With Ether.

By Wilbur L. Scoville.

The author has made a series of experiments with anhydrous ether (Sp. gr., 0·7201) and two lots of ether containing alcohol with a Sp. gr., respectively of 0·7250 and 0·7285, on a mixture of quinine, 0·300; quinidine, 0·020; cinchonidine, 0·150 and cinchonine, 0·150. Of this mixture 0·470 was ether soluble. The figures obtained were variable and it was shown that the alcohol in the ether has a very important influence upon the results. It was also pointed out that the separation of quinine by ether must be considered fallacious.

Creosote.

By Merck & Co.

The authors called attention to the origin and history of the use of creosote and the confusion of wood-tar creosote with coal-tar creosote and suggested in view of the increasing use of beech-wood creosote in treatment of consumption that the word creosote be applied hereafter only to wood creosote. After an interesting discussion on the paper, a resolution was passed by the Association to the effect that in view of the confusion of the name creosote, the latter should be restricted exclusively to the true wood-tar creosote.

Medicinal Plants of the Philippine Islands.

By Clement B. Lowe.

The author presented a review of a forthcoming book on this subject, which is being published by P. Blakiston's Son & Co.

Diphtheria Antitoxin.

By Joseph W. England.

The author gave a brief description of the methods of preparing and standardizing diphtheria antitoxin. Prior to the reading of the paper, L. E. Sayre, chairman of the committee appointed by the Association at the Richmond meeting to consider the advisability of asking the Committee of Revision of the U.S.P. to introduce diphtheria antitoxin, read his report which was adopted and referred to the Revision Committee.

The Alkalimetric Factors of Diacid Alkaloids.

By H. M. Gordin.

Inasmuch as in the alkalimetric estimation of alkaloids (*Ph. Arch.*, II, No. 10) the work is done in an excess of acid, the base in going out of solution ought always to carry along an amount of hydriodic acid corresponding to the highest state of basicity of the alkaloid. In the case of a monoacid alkaloid, using sulphuric acid for titration and Wagner's reagent as a precipitant, the reaction ought to go according to the equation $B_2H_2SO_4 + 2KI.I_n = 2BHI.I_n + K_2SO_4$. In the case of a diacid base, then, the reaction ought to take place as follows: $BH_2SO_4 + 2KI_n = B2HI.I_n + K_2SO_4$.

In the first case one molecule of the monoacid base carries down one molecule of the monobasic acid (hydriodic). In the second, one molecule of the diacid base carries down two molecules of the monobasic acid. But as the author has shown in another paper, berberine, even in the presence of excess of acid, is precipitated by Mayer's or Wagner's reagents, or potassium iodide along with only one molecule of hydriodic acid. The reaction in the case of berberine goes then as follows: $BH_2SO_4 + KII_n = B.HI.I_n + KHSO_4$. In this case a diacid base changes its basicity and is precipitated with only one molecule of hydriodic acid. In applying the alkalimetric method to the estimation of diacid bases it becomes necessary to establish the basicity of the alkalimetric factors of these alkaloids with regard to the amount of acid they take up when precipitated by Mayer's or Wagner's reagents.

An examination of the four principal cinchona alkaloids shows that, unlike berberine, these alkaloids, when precipitated in presence of excess of acid, take up two molecules of hydriodic acid for each molecule of the base.

Two New Methods for the Quantitative Estimation of Berberine.

By H. M. Gordin.

(1) A definite amount of the crude drug, say 20 gm., are extracted in a Dunstan & Short apparatus with hot alcohol on an asbestos plate until the alcohol comes out colorless, or nearly so. The extract when cold is made up to a definite volume, say 100 c.c., and filtered if not perfectly clear. To 25 c.c. of the filtrate one or

two c.c. concentrated sulphuric acid, previously mixed with a few c.c. alcohol, is added, the mixture diluted with ether to about double its volume and the assay finished exactly as just described. In the case of hydrastis, the rest of the alcoholic filtrate can be used for the estimation of hydrastine. For this purpose the alcohol from 25 c.c. of the alcoholic extract is distilled off till only a few c.c. are left, the residue diluted with water containing about one per cent. acetic acid and a few per cent. potassium iodide to 25 c.c. The liquid is then filtered and 12.5 c.c. of the filtrate are treated as described in a previous paper. If the liquid in which the berberine is to be estimated is a strong alcoholic extract like normal tincture of hydrastis, 20 c.c. are diluted *with four times its amount of alcohol* to 100 c.c., filtered if necessary, and 25 c.c. of the filtrate are treated exactly as above described.

This method is not well adapted to the assay of liquids containing a considerable amount of water or containing no alcohol at all, like fluid extract of hydrastis without alcohol. From such liquids, even after dilution with alcohol and filtration, sulphuric acid and ether precipitates much coloring matter besides the berberine salts, so that after the addition of potassium iodide and filtration as above described, the filtrate is sufficiently colored through the presence of the coloring matter to make the final reaction lack in sharpness. Owing to the quickness and simplicity of this assay method, it might be adopted by many even in those cases where the final reaction is not very sharp, *i. e.*, for solution of berberine salts containing much water.

But a much more exact assay method which can be used in all cases is as follows:

(2) Another method of estimating berberine in liquids containing much other matter is to separate the berberine by precipitating it as an insoluble hydroiodide, washing thoroughly with water containing a little potassium iodide and converting the moist hydroiodide into the very insoluble and beautifully crystalline berberine acetone. The latter can then be thoroughly washed with water and after drying at 105° C. to constant weight, weighed. One gm. berberine acetone is equivalent to 0.8524 gm. berberine. In order to obtain the acetone compound in a crystalline form suitable for washing it is necessary that the liquid should be warm and should contain about 33 per cent. acetone.

The Estimation of Chloroform.

By W. A. Puckner.

To 10 c.c. of an approximately normal alcoholic solution of potassium hydroxid, either free from chlorides or else of a known chloride content, and contained in a vial, add a measured volume of the chloroform-ether mixture representing 0·05–0·2 grammes chloroform,[1] stopper with a sound cork, cover with cloth and tie this down firmly, mix the two liquids by rotation, then place the vial in boiling water in such a way that at no time the contents come in contact with the cork and retain the temperature for three hours. Remove the vial from the bath, let cool, add phenolphtalein and then sufficient sulphuric acid to exactly neutralize the liquid,[2] then add two drops of potassium chromate T.S., and titrate with decinormal silver nitrate. Or if Volhard's method of estimation is preferred, add to the finished digestion 10 c.c. dilute nitric acid, an excess of decinormal silver nitrate, 5 c.c. ferric ammonium sulphate T.S., and determine the excess of silver nitrate with decinormal potassium thiocyanate. In either case 1 c.c. of decinormal silver nitrate represents 0·003969 grammes $CHCl_3$.

The Characterization and Classification of the Sesquiterpenes

By Oswald Schreiner and Edward Kremers.

In this, the fourth paper on the sesquiterpenes, the authors propose a system of classification for these hydrocarbons based on their structural relationships. According to this system they may be divided into five classes, as follows:

(1) Chain	compounds with	four	double bonds.
(2) Monocyclic	" "	three	" "
(3) Dicyclic	" "	two	" "
(4) Tricyclic	" "	one	" "
(5) Tetracyclic	" "	no	" "

[1] If the per cent. of chloroform in the mixture is not even approximately known, 1 c.c. may be digested with 25 c.c. normal alcoholic potassium hydroxid solution for one hour, and the residual alkali determined with normal acid and phenolphtalein, when the c.c. of normal alkali which disappeared during the digestion multiplied by 0·02977 will give the amount of chloroform contained therein sufficiently close to judge the quantity to be taken for the actual determination.

[2] This acid need not be of any definite strength; an approximately normal acid is convenient.

Each class is further divided into nuclear types, consisting of cycles of three, four, five or six carbon atoms. Such a system will include all possible compounds of the formula $C_{15}H_{24}$.

The second part of the paper is a report on some further experimental work with the sesquiterpenes.

The sesquiterpene of pepper oil has been identified as caryophyllene by preparing the characteristic blue nitrorite of this hydrocarbon.

The sesquiterpene of ginger oil is shown to be a new compound, and is designated as zingiberene. A dihydrochloride, a nitronchloride, a nitrorate and a nitrorite have been prepared.

Some further derivatives of caryophyllene were also reported on.

Comparative Pharmacological Study of Scopola and Belladonna.

By Heny H. Rusby.

This paper is a resumé of this subject and concludes that when administered internally scopola is more depressing and toxic, yet administered externally it shows almost no tendency toward absorption to the extent of producing systemic effects, but does act locally with promptness and efficiency; in eye practice more promptly and less prolonged, and more efficiently in all the other ways experimented with, save that of the plasters, where it is slightly less efficient than belladonna. Finally, scopola exhibits a distinct superiority over belladonna root in its greater uniformity of alkaloidal percentages.

Calcium Oxalate Crystals in the Study of Vegetable Drugs.

By Henry Kraemer.

The author gave a description of calcium oxalate crystals in vegetable drugs and considered their diagnostic value. (See page 471 of this Journal.)

Oxygen as a Standard for the Gasometric Tests of the Pharmacopœia.

By C. G. Hinrichs.

The author has made careful determinations on the oxygen standard, obtained by dissolving a weighed amount of pure crystal-

lized permanganate in peroxide of hydrogen acidified by one-eighth volume concentrated sulphuric acid. Since two atoms of permanganate produce 5 molecules of oxygen gas (half from each of the permanganate and peroxide, it follows that 316 milligrams give 5 times 24 or 120 c.c. of gas under the standard condition of this system. Hence 38 c.c. oxygen gas are yielded per decigramme of permanganate. The determinations made show that the values chemically produced agree exactly with the requirements of the reduction by calculation from temperature and pressure.

The Gross and Histological Characters of Powdered Coto, Paracoto, Wintera and Canella.

By Albert Schneider.

In summing up the histological comparison of the four vegetable powders, the author gives the following distinguishing characteristics for each :

(1) *Coto.*—Granular oil globules.

(2) *Paracoto.*—Absence of above granules.

Another difference between coto and paracoto is the behavior with nitric acid (concentrated or 40 per cent.). Place a pinch of the powders upon a slide and add a drop or two of the acid. The coto turns a deep red, while the paracoto becomes yellowish, which finally turns to a dirty yellowish olive green.

(3) *Wintera.*—No oil globules or very large sclerenchyma cells.

(4) *Canella.*—Numerous bright yellow resin masses, crystals and unequally thickened sclerenchyma cells. Of course canella is at once distinguished from the other powders by its color.

The Pharmacologic Assay of Preparations of the Suprarenal Glands.

By E. M. Houghton.

The author has devised a method based upon the changes produced in the blood pressure of the corotid artery, when variable quantities of a given preparation of the suprarenal glands, dissolved in slightly acidulated water, the inert substance being removed as far as possible, are injected into the femoral or jugular vein of an anæsthetized dog or other animal.

Sea Salt.

By Joseph Feil.

The author concludes that sea salt is neither evaporated sea water nor rock salt, but is purified crude sea salt and should find a place in the U. S. P., owing to its well-established use.

Note on the Application of the Cold Nitric Acid Test for Albumen.

By F. W. E. Stedem.

The author recommends the method of Napoleon Boston which simply allows a little urine to flow into a glass tube of small calibre by capillary attraction and washing off the outside of the tube with water, and then immersing the same (holding the finger on the tube to prevent the escape of the urine) into a test tube of nitric acid. Remove the thumb or finger very carefully from the tube, allowing the gradual ingress of the nitric acid from the bottom. The greater density of acid forces the urine slowly up the tube, and the point of contact is distinctly marked in the presence of albumen by a slight but always distinct layer of coagulated albumen.

A Few Remarks on the Atomic Weight of Arsenic.

By G. Hinrichs.

The Committee for the Revision of the U.S.P. has for over a year had the question of atomic weights under consideration.

In my work just published under the title "The Absolute Atomic Weights of the Chemical Elements, Established Upon the Analyses of the Chemists of the Nineteenth Century, and Demonstrating the Unity of Matter," I have presented the results of my investigations extending over almost half a century.

The results obtained by me were illustrated before the Association by the example of the atomic weight of arsenic, a metal of special importance to the pharmacist.

Sodium pyroarsenate is a fixed, accurately weighable compound of arsenic, therefore suitable for atomic weight determination. Prof. Edgar F. Smith, of Philadelphia, has shown that it is readily and completely converted into salt by gentle heating in a current of dry muriatic acid gas.

Ten such determinations were made under Professor Smith's

direction, using up to about 3 grammes of the pyroarsenate. In the last (tenth) determination, 3224·85 milligrammes of pyroarsenate yielded 2131·68 milligrammes of salt.

Accordingly, the *analytical ratio* is

$$\frac{\text{Salt}}{\text{Pyroarsenate}} = \frac{2131{\cdot}68}{3224{\cdot}85} = 0{\cdot}66102.$$

But the chemical formula of the pyroarsenate is Na_4O_7As; its common atomic weight is, therefore, 354.

The chemical formula of salt is NaCl, and its common atomic weight is 234.

These common atomic weights are our *fixed standards*, namely, for carbon-diamond taken as 12 *exactly*, O = 16, Na 23, Cl = 35·5, and As = 75 *exactly*, without further decimals whatever.

Accordingly, our *atomic ratio* is

$$\frac{4NaCl}{Na_4O_7As} = \frac{234}{354} = 0{\cdot}66102.$$

Since the analytical ratio *agrees exactly* with this our atomic ratio to the fifth decimal place, it proves that As = 75 *exactly* in fact.

A simple calculation shows that if the atomic weight of As were 75·01, the atomic ratio would be 38 lower, that is, 0·66064.

Since none of the observed analytical ratios are that low, it is thereby demonstrated that the true atomic weight of arsenic does not depart even as much as 0·01 from the exact number 75.

The mean of all the ten determinations made shows a departure of 0·002 only from the number 75.

Accordingly the true or absolute atomic weight of arsenic is 75 *exactly*, and the experimental uncertainty is only 0·002 on the mean.

In the same manner the experimental determinations for all the chemical elements have been examined in my work above specified.

In this way the fog that has for so many years rested over the atomic weights of the chemical elements has been lifted, and the use of false atomic weights seems to be no longer justifiable.

The Iodoform Reaction in Analysis.

By Lyman F. Kebler, B. S.

The iodoform reaction has within recent years played a considerable part in analytical work, and we are generally informed that ethyl alcohol will not react with iodine in an alkaline solution to

form iodoform at the ordinary temperature. The writer, however, has found that this observation is incorrect, this being brought to his attention while examining a sample of grain alcohol, concerning which there was some doubt relative to its purity. On applying the usual iodoform reaction it is found to indicate the presence of some iodoform producing substance; but subsequent examinations fail to prove that there was anything present excepting ethyl alcohol, The same reaction was then applied to ordinary grain alcohol, and to absolute alcohol, and the same reaction was developed with both. In fact, the ethyl alcohol can be completely precipitated as iodoform at the ordinary temperature, the precipitation, however, is slow, and especially so in cooler weather.

The Chemical Composition of Calcium Lacto-Phosphate.

By Lyman F. Kebler.

Very little information exists in literature relative to this product. It is described as a white, hard, shiny, scaly crystal, yet we are sure that no one ever saw this article commercially in the above form. It is generally supposed to consist of calcium lactate, lactic acid and calcium phosphate; an excess of lactic acid being always present to render the product soluble. According to the writer's experience the presence of the lactic acid does not account for the solubility of the calcium lacto-phosphate. The reason why calcium lacto-phosphate is soluble, is because that it is composed almost entirely of soluble products—namely, calcium lactate, calcium acid phosphate, lactic acid and a small amount of normal calcium phosphate. The latter is probably rendered soluble by the presence of the calcium acid phosphate and a small quantity of lactic acid. The analytical results are tabulated and the methods employed for determining the same are included in the paper.

Cinnamon Oils and Cinnamic Aldehyde.

By Geo. R. Pancoast and Lyman F. Kebler.

The authors collected the various kinds of cinnamon oils in the market and examined them as to purity as well as estimated the per cent. of cinnamic aldehyde. From the results obtained, the authors concluded that the various kinds of oils examined complied very closely with the quality for which they were sold, and they are of the opinion that this has largely been brought about by the

method for estimating the percentage contents of cinnamic aldehyde.

The cinnamic aldehydes have always tested up well. There are some reasons, however, for thinking that it is not as stable as the oil itself.

Extract of Meat.

By Lyman F. Kebler.

The author gives in tabular form the results of a chemical and physical examination of a number of samples of extract of meat. These samples represent the best grades as well as the cheaper article, and from the chemical analysis and other observations, it would appear that the price and the quality are not always consistent. In fact, in some cases there appear to be some points in favor of the cheaper product. Some of the methods of analysis were also touched upon and pointed out that they are not of very great value in certain cases. For example, one of the points made by a certain analysist is the amount of material soluble in 80 per cent. alcohol. Now it so happens that common salt is soluble in this strength of alcohol; consequently, the larger the amount of salt present, the greater the amount of extractive, which would indicate, according to this method, that the extract of meat containing the largest amount of extractive is best. The uselessness of such a method is quite apparent.

Adulterated Drugs.

By Lyman F. Kebler.

This paper included the results of the examination of a large number of cases of adulterated drugs met with in the course of the writer's work.

The Histology and Development of the Fruit of Illicium Floridanum.

By J. O. Schlotterbeck.

Specific Gravities and Co-Efficients of Expansion of Volatile Oils.

By Oswald Schreiner and R. W. Downer.

THE INFLUENCE OF SYNTHETIC REMEDIES ON VARIOUS URINE TESTS AND FALLACIES THEY OFTEN CAUSE.

By F. T. Gordon.

THE QUINHYDRONES AS PLANT PIGMENTS.

By Edward Kremers.

The Committee on the Revision of the United States Pharmacopœia, through the Chairman, Leo Eliel, presented the following report:

Ung. Hydrargyri Nitratis.—There is some complaint regarding the present formula. The formula of 1870 (lard and neatsfoot oil) was satisfactory, and a return to this formula is recommended.

The *alkaloid of sanguinaria* is used to a large extent, and should be made official.

The direction to melt and soften aloes in the manufacture of *compound extract of calocynth* should be omitted.

The *resin of jalap* should be used in the manufacture of compound cathartic pills, instead of the extract.

The strength of *chlorinated lime* should be reduced from 35 per cent. to 25 per cent.

Spirit of Ammonia.—By the official method of preparation none stronger than 2 per cent. can be made in laboratory work. In order to make a 10 per cent. preparation it is found necessary to pass ammonia gas into alcohol several hours under pressure, the receiver being closed with a mercury safety tube outlet.

Salicin should be defined as a glucoside (see Voswinkel's Work, Berl. Dtschr. Ph. Ges., 1900, p. 31).

Aromatic Waters prepared with calcium phosphate precipitated do not keep as well as those made by the cotton process. The hot water process is recommended.

Mass of Mercury.—In making this the metal can be more quickly extinguished by using about three times the pharmacopœial quantity of glycerin mixed with honey of rose. The finished mass will be too soft, but can be easily hardened by placing between folds of bibulous paper for a few hours.

Wax.—The resin test for wax should be changed to direct that the alkaline solution be filtered through glass wool or asbestos (see A. J. P., 1900, p. 74).

We desire at this time to refer to the suggestions previously made by this committee, and to especially emphasize the following, deeming their character to be such as to merit your most careful consideration at this time:

(1) That granulated opium be used for the tincture and deodorized tincture of opium, and the use of precipitated phosphate of calcium omitted.

(2) Deprive the seeds of colchicum and strophanthus of their oils before the preparation of the tincture.

(3) Adoption of the formula given in the report of this committee, 1895, for sapo mollis.

(4) Standardization of essential oils as suggested, 1896.

(5) Change standard of linum, sinapis alba, and sinapis nigra, for reasons given in report, 1896.

(6) Tincture nux vomica. Returning to formula of 1880, retaining the standard strength as in the 1890 edition.

(7) Standardization of podophyllum, prunus virginiana, sanguinaria, sarsaparilla, quillaja, senega, strophanthus, 1897.

(8) The report of 1898, paragraphs 1 to 13 inclusive, are especially referred to the Committee on Revision for their consideration.

(9) The same report, referring to the report of 1896, on which no action was taken, viz.: To dismiss all tinctures having a fluid extract of the same drug official, and all fluid extracts having a tincture of the same drug official, and substitute for such tinctures and fluid extracts a 50 per cent. tincture under *distinctive title.*

(10) Paragraphs 16 and 17 of the same report, referring to spirit nitrous ether and crude carbolic acid.

(11) Report of 1899, paragraph 1, referring to present formula for cold cream.

The officers of the section for the ensuing year are: Chairman, Lyman F. Kebler and Secretary, Joseph W. England. Mr. Hallberg moved that the officers of the section consider the feasibility of either forming a standing committee or having a reporter on drug adulteration and drug market.

COMMERCIAL SECTION.

The Commercial Section held one session on Tuesday afternoon. The Chairman, Charles A. Rapelye, delivered the annual address in which he pointed out that this section was originally "planned to handle as best it might the ever present question of cut prices, or at least to restrict the consideration of that question to its proper time and place in the work of the Association. It has by the formation of the N.A.R.D. had that question taken out of its hands, leaving the section more time to consider the mercantile interests of pharmacy which are now forcing themselves upon our attention to a much greater degree than could have been foreseen at the birth of this section." He further stated that "no one will attempt to deny that great progress has been made in professional pharmacy and it has not been accomplished without constant study and application, and our treatment of the commercial problems that surround us must be upon the same lines. We must not expect that the vexed questions of the trade will solve themselves; but, if overcome, it must be by untiring application to the devising of ways

and means for their extermination, and, if we will apply ourselves to the task, success will eventually attend our efforts. So much has been said and written concerning the adverse circumstances surrounding our business that many have come to believe that no remedy will ever be found to alleviate present conditions, but persistent and well directed effort will overcome almost any difficulties. What is needed is patient and united effort against our common foe."

Thomas N. Wooten, Secretary of the N.A.R.D., made an address in which he called attention to the need of closer association with physicians and surgeons and the development of the professional as well as commercial side of pharmacy.

F. W. E. Stedem exhibited samples of circulars and other papers which have been actually used as advertising mediums during the past year by pharmacists in various parts of this country. He strongly recommended the continual distribution of samples with circulars reminding prospective buyers of the advantages offered.

J. H. Beal read a paper on the "Control of Prices" and showed contrary to his expectations that the Worcester plan is the best plan yet devised and cited numerous instances showing that it was legal.

William Mittlebach read a paper on "Containers," in which he called attention to the excessive charges not unfrequently made for containers, and a resolution was passed by the section bringing the matter to the attention of the N.W.D.A. for their consideration.

Louis Emanuel read a paper on "The Profitable Side of Pharmacy" and Frank R. Partridge presented one on "Some Commercial Aspects of Pharmacy." The following officers were elected for the ensuing year: Chairman, F. W. Meissner; Secretary, E. G. Eberle; Associates, F. B. Lillie, Charles L. Meyer and Wm. Mittlebach.

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

This new section which has recently been organized held two interesting sessions, the first being held on Thursday morning when Henry P. Hynson, the chairman, read an address in which he called the attention of the members to the importance of the work of the section and the substantial aid it has received through Dr. Enno Sander in offering a cash prize of $50 for the most worthy paper

presented to this section. In a supplemental report on "Laboratory Possibilities" the chairman said:

Advanced medicine requires and stimulates advanced pharmacy.

There may be some question as to the justice or the advisability of the pharmacist undertaking the examination of pathological specimens—whether or not it is within the legitimate scope of his operations to assist in making diagnoses; but there can be no possible objection to him supplying the means for executing the processes by which conclusions are reached. Chemical apparatus, microscopes and microscopical accessories are profitable and creditable stock for the sales department, while the preparations of reagents, volumetric solutions, test solutions, microscopic stains, etc., can be prepared in his laboratory with perfect consistency and profitable satisfaction.

Physiological chemistry compasses nearly all the chemical operations of the physician and, besides the reagents purchased of the larger manufacturing chemist—for the quality and strength of which the pharmacist must be responsible—there are not a great many to be made by him, yet these should help to keep his laboratory busy.

Fehling's solution should, no doubt, be supplied in two parts, unless expressly ordered completed. The containers for these solutions and all other reagents should be glass stoppered bottles, as these add so materially to the appearance of an outfit.

Purdy's solution, at one time very popular, is occasionally called for and much of Geunzberg's test for acid hydrochloric is used, as are the solutions for the diazo reactions and the principal indicators.

Although no great variety of volumetric solutions are called for, quite a quantity of deci-normal sodium hydrate solution is sold and, while these solutions require time and care for adjustment, experience in this, as in everything else, gives facility. A standard must, of course, be at hand, and carefully recrystallized acid oxalic, the first time from alcohol, seems the most satisfactory. These solutions should be verified if more than a few days old.

Volumetric analysis is far less intricate than the uninitiated imagine and can be accomplished with fair accuracy by the average pharmacist after a moderate amount of practice. Ability to use this method of estimating opens up many interesting and profitable avenues to the retailer.

The microscope is so generally used in medicine to-day, that it is almost as necessary to be able to supply physicians stains and accessories as it is to fill prescriptions. The variety of stains is not large for ordinary demands, and not more than six or eight need be kept made up. Gabbett's stains, carbol fuchsin and methylene blue, Erlich's triacid stain, Jenner's gentian violet, hæmatoxylin-alum and Toison's dilution solution are among the more prominent. Success in their preparation depends largely upon the quality of the dry colors used. Ordinary commercial anilin will not answer. Gruebler's are the best to be had and, although comparatively expensive, can be used and still a good profit secured. Formulas for all these stains, reagents and solutions may be found in almost any modern work on pathology; "Simon's Clinical Diagnosis" is the best we have ever seen and Von Kahlden is good. Some of the processes for making them seem odd and unpharmaceutical and may, in many instanecs, be modified to advantage. Ehrlich's triacid blood stain is, perhaps,

the most difficult to prepare; the prescribed manipulation can be simplified by an accomplished pharmacist. Jenner's is simple but tedious in preparation and is becoming very popular for blood examinations.

In addition to products used in chemical and microscopical examinations others, just a little out of the ordinary, may be supplied. Physiologically normal salt solution may be kept on hand, sterilized in 500 c.c. and 1 litre Florence flasks, respectively. Salt tablets for making this solution are also popular. Thompson's bladder irrigating fluid and Muller's preserving liquid are sold in large quantities. Loefler's solution, used in diphtheria, is easily made and keeps well. Solution of adrenals, properly preserved, is in great demand. Mucilaginous lubricants for surgeons are a late requisite; Iceland moss with glycerine, is most largely used, dispensed in collapsible tubes. These lubricants must be sterile and antiseptic. Green soap, in tubes, should also be sterile. Before filling these, the screw of cap and neck should be coated with petrolatum and great care used to keep any of the soap off of the outside of tube; the reason for this is, no doubt, obvious.

Nebulizing solutions or liquids are more and more used and should be prepared by every active pharmacist. Formulas can be easily had from the manufacturers of the nebulizers and good judgment and pharmaceutic skill only are necessary to win success in their preparation.

Ability and facility in making chemical analyses and determinations are of immense advantage to the retail pharmacist doing a sufficiently large business. It is a telling advertisement to be able to examine and report upon a questioned tablet, capsulated powder or suspected solution. It is often a protection to one's self to be able to prove that doubts regarding a prescription are unfounded. Very recent instances are remembered of being compelled to examine bismuth and sugar powders, sulfonal capsules, solution of homatropine hydrobromate, tablets of cocaine hydrochloride, tablets of iron, arsenic and strychnine. It is also often a protection in business competition. When one *proves* to a customer that a competitor is supplying tincture of ferric chloride containing but 50 per cent. of alcohol, or tincture of iodine made of wood alcohol and containing but 3 per cent. of iodine, he is doing a good deal to help his business interests. Quite profitable is it when a pharmacist can go in the open market and buy chemicals and assayable products at 25 per cent. to 50 per cent. below the price of standard brands, prove their purity and worth, making, all the while, a reputation for himself and establishing a brand of his own.

These are a few of the possibilities of the pharmaceutic laboratory which I believe are not generally practiced and to which may be added many more by others with larger experience.

All this, taken in connection with the decline in specification, offers a large field for laboratory operations; enough, in an establishment doing an average business, to keep one person profitably employed during regular business hours.

In a second supplemental report, Mr. Hynson presented a collection of "Dispensing Notes" which embody the results of everyday experience in the drug store.

William F. Kaemmerer presented a paper which aroused a pro-

longed discussion on "Increasing the Prescription Work." The author stated that he has prepared a line of galenicals and with these and a number of selected drugs he calls upon the physicians and makes them aware of his facilities and ability to compound prescriptions and do professional pharmaceutical work. William C. Anderson pointed out that this paper indicated the advantage of the individual retail pharmacist in approaching the physician. J N. Hurty stated that it was science that exalts pharmacy, and the people as well as physicians should appreciate that you cannot get such perfect medicines as from pharmacists. J. L. Lemberger commended the plan in larger towns but said that in smaller towns where the physicians were personally known to the pharmacist it was not so practicable.

Henry F. Hassebrook read a paper on "Elixir Potassii Bromidi, N.F.," in which he advised the return to the use of elixir adjuvans, N.F., instead of the aromatic elixir of the U.S.P. This gave rise to a discussion on the subject of changes in the formulæ in the National Formulary. F. S. Hereth said that nothing will hurt the use of a good preparation so much as changing the formula and that care should be exercised in making changes unless essential. Caswell A. Mayo finally moved that the Committee on N.F. be requested to make no changes in colors or flavors of the preparations contained therein.

E. A. Sennewald read a paper on "Keeping Records of Prescriptions" and F. W. E. Stedem read a paper in which he called attention to some of the "Side Lines" that might engage the attention of the pharmacist.

Joseph W. England gave an "Improved Formula for Aromatic Spirit of Ammonia," as follows:

Ammonium carbonate (in translucent pieces), 500 grains; ammonia water, 2 fl. oz and 7 fl. dr.; oil of lemon, 2½ fl. dr.; oil of lavender flower, 15 min.; oil of nutmeg; 15 min.; oil of peppermint, 45 min.; alcohol, 1½ pints; water, q. s. to make 2 pints. To the ammonia water add 4½ fl. oz. of distilled water and in this mixture dissolve the ammonium carbonate reduced to a moderately fine powder. To the alcohol add the oils, then gradually the solution of ammonium carbonate. Allow the liquid to stand 24 hours in a cool place; filter, using a well covered funnel; keep the product in glass stoppered bottles in a cool place.

To this spirit oil of peppermint may be added and employed to replace "soda-mint." It may also be added to the effervescing draught of a "seidlitz powder."

Henry P. Hynson made " A Compilation of Threescore and More Prescriptions" that were presented a year ago, and these with the notes of the contributors formed the basis of an interesting discussion.

C. Lewis Diehl, chairman of the Committee on National Formulary, presented his annual report to this section which was discussed at considerable length and a special vote of thanks was tendered him.

The following officers were elected for the ensuing year: Chairman, F. W. E. Stedem; Secretary, William F. Kaemmerer; Associate, George W. Sloan.

SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

The chairman, C. B. Lowe, in his annual address called attention to the era of good feeling which seems to prevail among pharmacists generally and to the improved trade conditions, both of which he considered to be the result of organization. He regretted that the appointment of the members of State Pharmaceutical Examining Boards is so much a matter of politics and thought that the State associations might do much toward creating a sentiment which would influence these appointments for the better. A recommendation made by the chairman was to the effect that a committee be appointed by the Association to consider the question of rescinding the right to obtain product patents to be sold under registered names, this committee to be invested with the power to procure the services of eminent patent lawyers in forming the draft of a bill to be presented to the Association at its next annual meeting and, if approved by the association, to be finally introduced into Congress.

The secretary of the section, J. A. Koch, presented a report giving statistics concerning the pharmacists of the United States and also showing the number of registered pharmacists in this country to be approximately 85,849.

J. H. Beal gave a summary of the pharmaceutical legislation introduced or enacted during the last year.

Oscar Oldberg introduced a resolution requesting Boards of Pharmacy to require from each candidate for examination a statement concerning his preliminary education. The resolution carried and the secretary was instructed to send it to the various boards of pharmacy.

A paper on "A New Economic Order in Pharmacy" was read by Harry B. Mason. Having first treated of the historic evolution of industry the author said that "the final goal towards which industry has been moving throughout all the centuries is an era of co-operation and combination of effort. . . . In the field of production we already have in the trust a long stride towards the final goal, while in the field of distribution the rapid growth and success of the department store proves the inevitable tendency."

While individualism is a more dominant factor in the professions, the author is nevertheless of the opinion that the co-operative movement has already reached them, and a number of examples illustrating this tendency in law, medicine, and dentistry were given. That this tendency has reached pharmacy is shown by the "company pharmacy" in England and Scotland and to a certain extent in several of our larger cities in this country by the corporations owning a number of stores.

In conclusion the author took a hopeful view of this tendency in pharmacy. He pointed out the economic advantages which would probably arise in this country from a system of co-operation, and said that while the professional status of the calling might be temporarily lowered, the day of the trained pharmaceutical specialist would finally make its arrival.

A paper entitled "On Teaching Microscopy, Botany, Physiology, Pharmacodynamics and Urine Analysis in Colleges of Pharmacy" was presented by Albert Schneider. Having emphasized the importance of the study of microscopy, micro-technique and botany, the author gave as his opinion that the course in physiology should be more thorough than the average high-school course and that as this course is simply a preparation for the course in pharmacodynamics, special attention should be given to the functional activities of organs in order that the physiological action of drugs may be understood. The course in general pharmacodynamics should follow, but therapeutics should be almost entirely omitted as it belongs more especially to the domain of the physician. The author also said that the subject of urine analysis has no bearing upon pharmacy whatever, it being distinctly medical in character, and that therefore the course in this branch, if given at all, should embrace the usually recognized chemical tests for normal and abnormal urine.

A. B. Stevens made some remarks on the subject of prescriptions which were in part as follows: "For several years I have used original prescriptions of physicians for the teaching of prescription reading and compounding. While this method has its advantages it also has its disadvantages. Its principal advantage lies in the actual drill which familiarizes the student with different handwritings. Its disadvantages lie in being unable to call the attention of the whole class to any peculiarities in writing, abbreviation or incompatibilities, or to point out difficulties in compounding. This disadvantage is best overcome by the aid of the stereopticon. Facsimiles of prescriptions may be easily made upon glass by covering the glass with a very thin film of old turpentine, or a little resin dissolved in turpentine. This is best accomplished by placing a drop of the turpentine on the glass and rubbing it over the surface with a piece of flannel. The film must be very thin else the ink will not flow freely from the pen. Place the glass thus prepared over the prescription to be copied and trace with India ink. Recently I have preferred to use celluloid in place of glass. It is more convenient and being thinner than glass a more perfect tracing can be made. The celluloid may be obtained in strips several feet in length and the prescriptions copied in the same manner as upon glass. Spirit of camphor may be used in place of the oil of turpentine. The strips of celluloid may be placed on rollers similar to those used in photographic cameras. For the study of incompatibilities I have copied upon celluloid, by means of a typewriter, the prescriptions given in Ruddiman's Incompatibilities. Then a certain number of prescriptions may be assigned to the class for a lesson. During the recitation the prescriptions are thrown upon the screen and members of the class are called upon to read the prescription, explain the incompatibilities, if any, also explain the method if compounded. Later the class is required to explain prescriptions not given in the textbook."

A paper on "The Liquor Laws of the States and Provinces as They Apply to Pharmacists" was read by C. B. Lowe.

The following were the officers of the section elected for the ensuing year: Chairman, E. G. Eberle, of Texas; Secretary, J. W. T. Knox, of Michigan. W. C. Anderson, of Brooklyn; Harry B. Mason, of Detroit, and Caswell A. Mayo, of New York City, were elected associate members of this Committee.

At the final general session of the Association the reports of various standing committees were read. J. U. Lloyd presented two papers, one being on the "Versatility of Dr. Charles Rice" and the other on "A Ginseng Garden." In the latter paper the author describes the ginseng garden of S. Long, of Union, Boone County, Ky. The experience of Mr. Long as recorded in his own words will be of particular interest to those concerned in drug cultivation:

"I secured first about 300 plants from the woods where ginseng naturally grows in this section of the country. These plants were taken up with great care, plenty of dirt being left on the roots. They were carried in the cool of the day from their native location to the garden I had prepared. The earth was such as I would have used for the purpose of raising onions, a rich loamy soil. These plants were set about 6 inches apart, the rows being about 6 inches from each other. I did not notice in any instance that the transplanting disturbed the early plants in the least. From these 300 plants I collected the first year about 3,000 seed. That fall when the seeds had ripened I collected from the woods about 600 more plants, which I planted in the same manner as I had done the 300 plants, making a total of 900 roots. The following spring out of the 900 roots, 800 came up making a good crop of seed. To this I will add that of the plants set out in the fall there was a greater proportion lost than of the plants that were set out in the growing season. The seeds that ripened in July, if planted at once, will come up the next spring; those that ripened later do not come up until the second spring. I cannot give the proportion of loss in sprouting. The first year's plant is a little three-leaved spindle, and the growth is very slow. As is well known, the scars left by cast-off stalks give the age of the root. I have plants in my garden that are at least twenty years of age. I am cultivating ginseng both for the root and the seed, the seed at this time being very costly, although the root only has any commercial value except for planting. I am enlarging my gardens as rapidly as possible and use all the seed that is produced, at present having none to distribute."

ARKANSAS ASSOCIATION OF PHARMACISTS.

The nineteenth annual meeting was held May 21st at Little Rock. The President, E. F. Klein, delivered an address directed principally to the beneficent influences of associations.

John B. Bond, Sr., reported for the Committee on Legislation that it had been found inexpedient to introduce before the late session of the Legislature the legislation recommended by the Association at its eighteenth annual meeting (viz., the repeal of Section 4,993 and the substitution of a small annual fee for registration; also requiring all candidates for registration, whether graduates or not, to pass an examination before the Board of Pharmacy). The

reason why no attempt was made, says the report, was that the Committee on Legislation early discovered that certain members had come to the capital cocked and primed with legislation inimical to pharmacy, as well as against the best interests of the people, which they had determined to force through. Among the many fool things that were proposed by the legislators referred to, was a clause tacked onto a medical practice bill, imposing a fine of $100 on any pharmacist or druggist who recommended a medicine, whether proprietary or not. The committee centered its work on the defeat of the clause and effected it. Unfortunately, however, the medical practice bill, which was shorn of this obnoxious paragraph, a good and wise act, was also defeated. The report gave strong praise and commendation to the Senate of Arkansas for its liberal and beneficent treatment of pharmacy. The report was received and accepted.

The following officers were elected for the ensuing year:

President, William R. Appleton; Vice-Presidents, J. H. Carnahan and J. H. Chestnutt; Secretary, L. K. Snodgrass, Little Rock; Treasurer, J. A. Junkind; Executive Committee, J. F. Dowdy, J. B. Bond, Jr., C. K. Lincoln.

COLORADO PHARMACEUTICAL ASSOCIATION.

The twelfth annual meeting was held at Manitou, June 19th. The President, C. D. Barnes, in his address, deplored the passage of the recent law compelling druggists to pay a State liquor tax of $25.

The following officers were elected to serve during the ensuing year:

President, W. L. Shockley; Vice-Presidents, D. Y. Wheeler, F. F. Whiting; Secretary, Charles E. Ward; Local Secretary, H. F. McCrea.

The place of the next meeting will be Denver, and the time will be next June.

CONNECTICUT PHARMACEUTICAL ASSOCIATION.

The twenty-fifth annual meeting was held at Branford, June 11–12. Numerous reports were read.

J K. Williams reported that during the past year no change had been made in the laws affecting pharmacists; no legislation prejudicial to their profession had been passed. The interests of the

pharmacists of the State had been carefully considered. Many bills were presented which might have caused trouble, but all had been adversely reported and had been rejected.

M. P. Gould, of New York, read a paper on "The Business Side of Pharmacy," which was followed by a spirited discussion, in which a number of members and visiting delegates expressed their opinions regarding various questions.

The officers elected for the ensuing year were: President, Charles Fleischner; Vice-Presidents, Thomas R. Shannon and A. C. Dickinson; Secretary, Charles A. Rapelye, of Hartford; Treasurer, John B. Ebbs. Seventy-three new members were elected.

DELAWARE PHARMACEUTICAL SOCIETY.

The fifteenth annual meeting was held on June 6th at Delaware City. One of the most valuable features of the meeting was an address on Pure Foods and Drugs by Professor Robin, Bacteriologist of the State Board of Health. This paper will be printed later. The following officers were elected for the ensuing year:

President, J. T. Challenger; Vice-Presidents, W. C. Taylor, Henry McDaniel and T. F. Hammersley; Treasurer, Oscar C. Draper; Secretary, F. W. Fenn, Wilmington; Executive Committee, N. B. Danforth, Albert Dougherty and T. Harry Cappeau.

GEORGIA PHARMACEUTICAL ASSOCIATION.[1]

The twenty-fifth annual meeting was held at Atlanta, May 21st. The President, M. H. Taylor, delivered an address devoted to a *résumé* of the work accomplished by the Association during the year.

A number of papers were read, among them the following: "How to Advertise the Retail Drug Business," by J. C. Kidd, Milledgeville; "On the Manufacture of Pharmaceuticals by Retail Druggists," by J. C. Persee, Atlanta; "Hydrophobia: Its Treatment, Prevalence and Prevention," by Dr. H. R. Slack, and "Turpentine," by Dr. George Payne.

The following officers were elected for the ensuing year: President, W. S. Elkin, Jr.; Vice-Presidents, J. H. Polhil, Charles D. Jor-

[1] *Nat. Drug.*, p. 194.

dan, J. E. Kidd; Secretary, C. T. King, Macon; Treasurer, J. T, Shuptrine. Brunswick was chosen as the next place of meeting, the time being May, the day to be set by the Executive Committee.

INDIANA PHARMACEUTICAL ASSOCIATION.[1]

The twentieth annual meeting was held June 5–7, at Muncie. The President, F. W. Meissner, in his address announced that an old standing indebtedness of the Association, amounting to some $1,200, had been paid during the year.

The following papers were read:

"Preventive Medication for some Drug Troubles." By E. Stahlhuth.
"Duty." By W. O. Gross.
"Emergencies." By J. N. Roe.
"The Indianapolis Association of Retail Druggists." By I. N. Heims.
"Pharmaceutical Education." By G. D. Timmons.
"Local Associations." By I. N. Heims.
"Elixirs." By J. H. Andrews.
"The Different Iron Preparations." By J. W. Stürmer.
"The London Crude Drug Market." By M. Little.

The following officers were elected for the ensuing year:

President, C. O. Prutzman; Vice-Presidents, E. W. Swadley, John Gifford, Alexander Ruh; Secretary, A. Timberlake, Indianapolis; Executive Committee, F. E. Wolcott, Otto Gross, F. L. Burton.

Anderson was chosen as the next place of meeting, C. A. Henderson, of that place, being chosen Local Secretary. Fifty applicants for membership were elected and put upon the roll, which now numbers about 750 in good standing.

INDIAN TERRITORY PHARMACEUTICAL ASSOCIATION.[2]

The seventh annual meeting was held at South McAlester, May 21st. Thirty-nine new members were elected.

L. Matthews, Miami, read a paper on the "Relations of Clerk and Employer." Mr. White, chairman, read the report of the Committee on Legislation. The report was one of progress, and an appeal was

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[1] *Nat. Drug.*, p. 235.
[2] *Nat. Drug.*, p. 195.

made to the members to assist the committee with suggestions, and to aid it in its efforts to get the law pending before Congress (which the committee thought had a good chance to become a law), passed, either by personal solicitation of Congressmen or otherwise. The committee promised to secure the endorsement of the judges and officials of the Territory, and of the other associations to the bill now pending.

The Secretary was instructed to ascertain the requirements for membership in the National Association of Retail Druggists, also of the A.Ph.A., with the view of sending delegations to the next annual meetings of these associations.

The following officers were elected for the ensuing year: President, L. Matthews; Vice-Presidents, H. F. Hancock, F. C. Savage, A. R. Breeding; Secretary and Treasurer, H. D. Knisely.

Checotah was selected as next place of meeting, May 21-23 being the time.

IOWA PHARMACEUTICAL ASSOCIATION.

The twenty-second annual meeting was held in Storm Lake, July 9–11. The President, E. V. Baldwin, delivered an address devoted to a *résumé* of the important events of the year, and made a number of suggestions toward the betterment of pharmacy in that State. The report of the Secretary, F. Howard, showed the Association to be of increasing interest to the pharmacists of Iowa. The Treasurer, J. B. Webb, reported a balance in the treasury. The following papers were read:

"Is the Modern Prescription Tending Towards the Mere Specification of Proprietaries?" By J. H. Mallard and A. H. Miles in separate communications.

"The Sale of Poisons.' By Carrie Wood.

"How Can a Druggist's Wife Best Promote Her Husband's Business Interest?" Mrs. W. G. Beale, Mrs. F. Howard and Miss Lois Stevens in separate communications.

The following officers were selected for the ensuing year: President, E. B. Tainter; Vice-Presidents, Frank Shane, Howard S. Baker and E. M. Funk; Treasurer, Jno. B. Webb; Secretary, Fletcher Howard, of Des Moines; Executive Committee, F. J. Gressler, A. A. Broadie, and A. H. Miles.

It was decided to hold the next meeting at Sioux City.

KANSAS PHARMACEUTICAL ASSOCIATION.[1]

The twenty-second annual meeting was held at Topeka, May 21–23. The President, H. W. Mehl, in his address, complimented the State Legislature upon its liberality in appropriating $55,000 for a new chemical laboratory and building at the the State University at Lawrence.

H. L. Raymond presented the report of the Committee on the School of Pharmacy at the State University, in which he stated that the condition of the students, buildings, apparatus, etc., were in a greatly improved condition. The attendance was much increased and highly encouraging. The liberality of the Legislature was fittingly acknowledged, but attention was called to the unfinished condition of some of the new departments, and aid was asked for funds to complete them. The extension of the course from two to three years was recommended, and it was thought that all interests would be better conserved if this were done. The report was signed by the full committee. Professor Sayre, as a supplement to the report, called attention to the vast number of new remedies introduced during the last two years, and presented an analysis of the therapeutical character of the list (embracing in all 170 remedies).

The Committee on Legislation directed attention to the law enacted at the last session of the Legislature prohibiting the sale of morphine, cocaine and chloral-hydrate, except on the prescription of authorized physicians. The committee recommends to every druggist that the poison register be kept close at hand and that every sale of poison be scrupulously entered therein at the time of such sale.

W. E. Sheriff, Secretary of the Kansas Board of Pharmacy, presented his report of the transactions of the Board from June 7, 1900, to May 20, 1901. It announces the completion of the indexing of the names of the registered pharmacists and registered assistants, and the purchase of a case for keeping the records. A record is being kept of those (non-pharmacists) to whom licenses for sale of domestic remedies are issued. The examination of 108 drug stores, made by H. W. Mehl, shows that of the proprietors, eighty are registered. Of the remainder, eleven are conducted by registered managers and twenty-six registered clerks. Mr. Mehl found seventy-nine poison registers. Examination reports showed 117 general mer-

[1] *Nat. Drug.*, p. 194.

chants handling domestic remedies, only a few of whom had licenses. There have, however, been 131 licenses issued. Finally, the report states that there are in the state 1,451 pharmacists registered and in good standing and sixty-two registered assistants.

The following is the result of the election of officers: President, F. A. Snow; Vice-Presidents, J. W. Cookson, M. S. Ingalls; Secretary, E. E. Lair, Topeka; Treasurer, G. Gehring; Librarian, L. E. Sayre; Local Secretary, Walter Henri.

The Executive Committee, W. S. Amos, E. C. Tritsche, George Seitz, A. O. Rosser and J. R. Fay.

MAINE PHARMACEUTICAL ASSOCIATION.[1]

The thirty-fourth annual meeting was held at Portland.

President H. Boynton, of Biddeford, was unable to be present on account of illness, and his address was not read. The report of the Secretary, M. L. Porter, showed an active membership of 281. Fifteen new members were elected at this meeting. The report of the Treasurer, W. J. Drew, showed the finances of the Association to be in good condition. Percy L. Lord, President of the Maine Commission of Pharmacy, reported that the board had examined ninety-one applicants for registration during the year.

The following papers were presented:

"A Brief History of Cinchona." By J. F. Sanford.

"Our Customers; How Shall We Treat Them so as to Increase their Number?" A. G. Gilmore.

"Cinchona: History, Methods of Cultivation and Collection, Products and Alkaloids." E. T. Bowers, Lewiston.

The following officers were elected: President, F. R. Partridge; Vice-Presidents, D. P. Moulton, F. T. Crane, G. W. Wiley, Secretary, M. L. Porter, Danforth; Treasurer, W. A. Drew; Executive Committee, five officers with George W. Dorr and S. F. Clark.

MINNESOTA PHARMACEUTICAL ASSOCIATION.[2]

The seventeenth annual meeting was held June 18–20, at Lake Minnetonka. The President, B. O. Kyseth, delivered an address

[1] *New England Drug.*, p. 503; *Ph. Era*, p. 117.

[2] *Pharm. Era.*, p. 27.

devoted to the interests of the pharmacists of the State. The Secretary, E. B. Wilson, reported thirty-two applications for membership. The Treasurer, H. W. Rietzke, showed the finances of the Association to be in good condition.

"Trade Interests" was the subject of a paper by A. W. Eckstein.

The following officers were elected for the ensuing year:

President, Stewart Gamble; Vice-Presidents, Charles Weschker, Miss Anna C. Umland and M. D. Fallman; Secretary, E. B. Wilson, Minneapolis; Treasurer, H. W. Rietzke; Executive Committee, John F. Danek; A. T. Hall and J. H. Marshall.

The next meeting will be held at Lake Minnetonka, in June, 1902.

OKLAHOMA PHARMACEUTICAL ASSOCIATION.[1]

The annual meeting was held in May in Oklahoma City. The following papers were read:

"Should Purity be the Prime Consideration." By C. A. Dow.
"Knights of the Grip." By Nels Darling.
"Profits to be Derived from Window Dressing." By D. A. Boland.
"Women in Pharmacy." By Miss Minnie Wood.
"Tablet Triturates." By Wm. McCutcheon.
"Social Duties of the Pharmacist." By F. A. Wheeler.
"Soda Fountain." By J. A. Hill.
"The Pharmacist and the Physician." By John Wand.

The following officers were elected for the ensuing year: President, Fred Reed; Vice-Presidents, J. C. Burton, J. C. Hynds; Secretary, Frank Weaver, of Oklahoma City; Assistant Secretary, W. B. Wheeler, of Guthrie; Treasurer, J. M. Remington; Local Secretary, J. A. Hill.

The next meeting of the Association will be held at Enid.

SOUTH CAROLINA PHARMACEUTICAL ASSOCIATION.

The twenty-fifth annual meeting was held at Charleston, S. C., May 22 and 23, 1901. O. Y. Owings, the president, called attention to the matters of legislation and the pure food and drug law. The report of the Secretary and Treasurer, Frank M. Smith, showed a total membership of 104 as against 93 last year. The dues have been reduced from $3.00 to $1.00, but nevertheless have only been

[1] *Western Druggist*, p. 329.

paid by some of the members. E. S. Burnham, Chairman of the Examining Board, reported that six applicants had passed the Board and that twenty-three had received licenses on their having diplomas.

The meeting was concluded with a banquet in which toasts were responded to by E. F. Parker, E. S. Burnham, A. Memmin, J. E. Burke and C. W. Kollock.

The following officers were elected for 1901–1902: President, O. Y. Owings; First Vice-President, J. A. Barbot; Second Vice-President, D. F. Frierson; Secretary and Treasurer, Frank M. Smith. The semi-annual meeting will be held in Columbia.

TENNESSEE PHARMACEUTICAL ASSOCIATION.[1]

The sixteenth annual meeting of the Tennessee Druggists' Association was held at Monteagle July 17–19th. A paper on "What Pharmaceuticals is it Profitable for the Pharmacist to Make?" was read by A. B. Rains, of Columbia. B. H. Owen read a paper on "What are the Best Methods of Advertising?" He said that more than half the money spent in advertising is wasted on account of injudicious methods.

At the second day's session two honorary members were enrolled, Rev. W. D. Powell, of West Tennessee, and Daniel Champion, of Alabama. A number of papers were read, and the following officers were elected:

President, H. W. McDonald; Vice-Presidents: J. C. Treherne, J. D. Kuhn and J. J. Ingle; Secretary, W. R. Vickers; Treasurer, J. C. Ammons. Bon Aqua Springs was selected as the place for the next annual meeting.

TEXAS PHARMACEUTICAL ASSOCIATION.[2]

The twenty-second annual meeting was held in Sherman, Texas, May 14 16, 1901. The address of the President, James L. Hazlett, was devoted in particular to the consideration of the pharmacy law, and it was recommended that a committee be appointed to draft a suitable and satisfactory law. This was heartily endorsed by the

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[1] *Amer. Drug*, p. 94.

[2] *Texas Druggist*, August, 1901.

Committee on President's Address. The report of the Secretary and Treasurer, R. H. Walker, showed the finances and membership of the Association to be in a healthy condition.

The following papers were read:

"Labelling, Dispensing and Delivery of Prescriptions." J. Pfeiffer gave a number of suggestions from his own experience.

"Miscellaneous Notes." W. R. Neville gave a number of practical hints on compounding prescriptions. An English physician who prescribes glycerite of lead frequently gave this as the formula:

Liq. Plumbi subacet. 1 dr.; glycerine, 2 drs.; lanoline, 4 drs. This was used in proportion, 1 dr. to vaseline 2 drs.

"Quality of Market Drugs." T. R. Keene gave the following results of the examination of a few drugs: Alcohol, twenty-two samples were examined, but three came within pharmacopœial requirements. Asafetida, out of thirteen specimens investigated, not one contained more than 42 per cent. of alcohol soluble matter; some of the highest priced gums were of the worst quality. Castor oil—twelve samples were examined, but one was adulterated (with approximately 50 per cent. cotton-seed oil).

Cream of Tartar—Four specimens from drug stores, and seven from the groceries were examined. Those coming from the drug stores were all up to standard, in every respect, but those from the groceries, were badly adulterated; two of them contained only 40 per cent. of cream of tartar and none of them over 80 per cent. The principal article used for cheapening purposes was starch. Glycerine—Five samples were examined; all were fairly good. Calomel—Nine different lots of calomel were investigated; all were satisfactory. Cocaine—Nineteen samples were examined; five of them, each from a different manufacturer, were taken from original packages. All of these five were as good as is required. The other fourteen were purchased from various retail drug stores. Four out of these fourteen were all right, but the other ten were adulterated with acetanilid from 20 to 60 per cent.

Opium—Eight samples of assayed powdered opium all conformed to the claims made upon the labels, within the reasonable limits of errors, and allowance for different processes of assay used.

Laudanum—Numerous samples of laudanum have been assayed; some from the jobbing druggists, some from the retail druggists and others from the groceries. About half of them were near enough right to show good intentions upon the part of the maker, while the balance showed all degrees of badness, down to a dark colored liquid that took a stretch of the imagination to even give it the name of laudanum.

Many other articles have been examined, more or less closely, with results that on the average compare with those spoken of above; the conclusion is that the jobbing druggists, on the whole, are supplying the retail trade with drugs of as high a grade as the retailer is willing to pay for, and that where they send out goods that are not as good as they should be it is because of the continual demand made upon them for articles that bear the name regardless of quality. The author concludes that just as soon as the retailer asks for higher class drugs, the jobbers will gladly supply them.

"Essentials Oil of the Pharmacopœia." E. G. Eberle presented a chart for ready reference of the more common essential oils, relative to their purity, production, preservation, tests, etc.

VIRGINIA PHARMACEUTICAL ASSOCIATION.[1]

The annual meeting was held at Elkton, on July 16th. The President, A. W. Eley, in his address recommended that the Association endeavor to have inserted in the new constitution of Virginia, a clause to prohibit the Legislature from passing relief bills to allow certain persons to become druggists without passing the examination.

The Secretary, C. B. Fleet, suggested in his report, that a committee be appointed to consider the advisability of the Association publishing a journal or securing a department in some journal that was already in existence. On motion, the matter was referred to a special committee and a report on it will be made at the next meeting of the Association. Mr. Fleet also suggested that the Association take some steps in assisting the Board in prosecuting violators of the pharmaceutical laws, and on motion, a committee was appointed for that purpose.

Treasurer Lumsden's report showed Association finances to be in a healthy condition.

The committee appointed at last year's meeting to make an exhibit of National Formulary preparations before the Virginia Medical Association at its late annual meeting, reported that it had prepared a most creditable exhibit of these preparations and exhibited them to the physicians in attendance. All seemed interested and the committee believed the exhibit would result in convincing physicians of the value of the National Formulary preparations.

The Committee on Legislation reported its continued effort to prosecute violators of the pharmacy laws, and the continued difficulty which they found in getting the Commonwealth attorneys to take hold of the violations and violators. An appropriation was made to assist the Committee in its programme of war against transgressors of the pharmacy laws.

At the election of officers for the ensuing year the following were selected: President, E. L. Robey; Vice-Presidents, John L. Hagan and N. B. Schmitt; Secretary, C. B. Fleet, of Lynchburg; Local Secretary, Thomas S. Howell, of Hampton; Treasurer, C. H. Lums-

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[1] *Nat. Drug.*, p. 263.

den; Executive Committee, T. A. Miller, John T. Watson and Richard Gwathmey.

Candidates for vacancies on the Board of Pharmacy: Edgar Warfield, N. B. Schmitt, G. T. Mankin, C. B. Fleet and H. W. Cole.

For the next place of meeting Old Point Comfort was selected.

THEODOR HUSEMANN.

Theodor Husemann, Professor of Pharmacology and Toxicology in the University of Göttingen, died rather suddenly on February 13, 1901, having lectured with his usual vigor on the same day.

The name Husemann has been a familiar one in medicine and pharmacy for more than a hundred years. Theodor Husemann, the subject of this brief sketch, was born on January 13, 1833, in Detmold, Germany. He received his preliminary education in the Gymnasium in Detmold and later studied medicine and the natural sciences in the Universities of Göttingen, Wurzburg, Prag and Berlin. He was assistant for several years to Professor Oltendorf, in the University of Prag and while there perfected his knowledge of the languages and of the history of the natural sciences and medicine, thereby laying the foundation for his future success in these departments. Beginning in 1856 with a paper on the Historical Study of Pediculosis, Husemann became renowned for his contributions on historical and philological, medical and scientific subjects. In the latter part of the fifties, he began his studies and researches in pharmacology and toxicology, subsequently writing a number of important papers on these subjects, among which may be mentioned: Potassium Cyanide Poisoning, Symptoms of Strychnine Poisoning, Ptomaines and their Significance in Judicial and Toxicological chemistry, [1]etc. It may be said that his work went far to lay the foundations of the scientific study of toxicology.

Husemann undertook to practice medicine in 1859 and 1860, but gave it up to devote himself entirely to his toxicological and pharmacological studies in the University of Göttingen. He began to publish a series of valuable papers on Meat Poisons and Meat Poisoning and made a reputation for himself in various poison litigations.

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[1] This paper was translated by Dr. F. B. Power from the *Arch. Pharm.*, 1881, p. 415 and appeared in this JOURNAL, 1882, p. 152.

The valuable "Handbuch der Toxikologie" which was published in 1862, was the joint work of him and his uncle A. Husemann. In 1861 he was made reporter on Pharmacology and Toxicology for the *Jahresberichte fur die gesammte Medecin*, which position he held during the remainder of his life.

In 1865 he was made "*venia legendi*" on pharmacology and toxicology at the University of Göttingen and by dint of hard work and enthusiasm became, in 1872, professor of these subjects.

Husemann was perhaps best known to scientists abroad for his remarkable work on "Die Pflanzenstoffe in chemischer, physiologischer, pharmakologischer und toxicologischer Hinsicht," the first edition being the joint work of August Husemann and himself, while in the second edition he was assisted by A. Hilger. This book is classical in character and one of the most important books that has been written along this line of investigation and has made possible the various monographs on the alkaloids, glucosides, tannins, etc.

Among his other works may be mentioned his "Handbuch der Arzneimittellehre" which was first issued in 1873 and has been for years among the important reference books of the pharmaceutical and medical students in Germany.

He was a frequent contributor to the important encyclopædic works and wrote many papers on a great many different topics including the natural sciences, philosophy, philology, as well as pharmacology and toxicology. He was known in pharmacy more especially because of his studies on aconite, blatta, false star-anise, strophanthus, on the derivation of the words syrup, drug, bismuth, etc.

Husemann was a scientist by nature and by training and always devoted his energies to the subject at hand for which he had the best opportunity for study and development. The late Baron von Mueller thought so much of him as to name an Australian genus of the Menispermaceæ after him, viz: *Husemannia pratense*. Husemann was honored by membership in many scientific societies, among which was this College. In the editorial sketch in the *Pharmaceutische Zeitung*, the editor, in summing up the various accomplishments of Husemann, says: "It is not too much to say that he was a universal genius, the like of whom is seldom seen."

H. K.

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ADRENALIN THE ACTIVE PRINCIPLE OF THE SUPRARENAL GLANDS AND ITS MODE OF PREPARATION.

By Dr. Jokichi Takamine.

I have no doubt that a good many of you present have read an account of adrenalin, and some of you no doubt have used it. Inasmuch as, however, this is the first time the active principle of the suprarenal glands was isolated in a commercial scale, and such might lead to the isolation of the active principle of other interesting glands, I venture to submit before you a brief sketch as far as investigation has gone.

Forty-six years ago, Adison first observed the certain changes of the suprarenal glands and their relationships to the disease now bearing his name. Oliver and Schafer's work on the physiological action of the glandular extract, was soon followed by Scymonowicz, Cybulski, and later by many others. The suprarenal therapy has since become, not only a subject of scientific interest, but has successfully been applied in various branches of medical practice. Marvelous therapeutic value of the suprarenal extract has now been established and proved beyond all doubts.

As the use of suprarenal extract increased, a keen desire to obtain its active ingredient in pure state was generally felt by medical practitioners, for reasons that the said extract is prone to deteriorate very rapidly and hence the necessity of preparing fresh each time before use.

Many able chemists turned their attention toward isolation of the active principle, desiring it might become a very useful agent in therapeutics. So far as chemical nature is concerned, but a little

knowledge has been contributed over Vulpian's original observation that ferric chloride and iodine impart characteristic hues to the glandular juice.

J. J. Abel's investigation on the subject has no doubt thrown some light on the chemical side ; unfortunately for him, however, he was not working with the active principle but a somewhat modified substance, or the benzoyl-compound which withstood his autoclave treatment.

Otto von Furth, of Germany, worked on the same line of research and has already written several papers in which a controversy against Abel's epinephrin was entertained. Epinephrin is a substance in suprarenal glands isolated by Dr. Abel and claimed by him to be the active principle.

It is von Furth who declared that epinephrin is not the active principle of the gland but an inert substance mixed with diversified proportion of his suprarenin, which he claims to be the real principle, according to conditions of preparation, hence its variegation of physiological activity. Epinephrin may be made entirely inactive by simply refining it. This was also observed by Abel who ascribed its modification to the nature of the substance and concluded that there are at least two isomers of epinephrin, namely, active and inactive.

Suprarenin, according to its author, is obtained from the filtrate in which Abel considered no epinephrin does exist. The wide difference in the process of preparation and almost entire dissimilarity of chemical reaction of the suprarenin and epinephrin tends to put outsiders in obscurity in determining whether or not there are two ingredients in suprarenal glands, exerting similar physiological activity.

Abel, however, recently published a further observation on epinephrin, in March number of the Johns Hopkins Hospital Bulletin, 1901, in which he substantiated von Furth's statement that the unaltered or rather native active principle of the gland is not at all precipitable by ammonia and naturally he recognized that epinephrin was indeed a modified substance of the active principle as Furth argued, thus having partly concluded the dispute between the two authors. Still, however, there remains a question whether suprarenin be the pure active ingredient or a mixture thereof, with more or less inert matters, as long as von Furth cannot get it in pure, stable, definite forms.

Last summer I devoted my attention to this subject and am pleased to announce that I have succeeded in isolating the active principle in a pure, stable, crystalline form, the base itself. I do not by any means desire to usurp the credit due to the pioneer investigators, yet in view of the fact that neither of the authors quoted above have obtained the active principle in a pure form, and that there may exist some room for controversy, I have, therefore, termed my substance, as I isolated, " Adrenalin."

Isolation of the active principle of the suprarenal glands:—

The mode of preparing the active principle of the suprarenal glands is as follows: Suprarenal capsules finely disintegrated by suitable means, are steeped in water or acidulated water for a period of about five hours at a temperature varying from 50 to 80 degrees centigrade, with frequent agitation and with the addition of water as it evaporates. The temperature of the mass is now raised from 90 to 95 degrees centigrade for the period of one hour so as to coagulate as much albumenoid as possible.

As the active principle of the glands is prone to absorb the oxygen from the air, to form inactive substance, it is necessary to avoid exposure of the liquid to the air as much as possible. A layer of fat floating on the surface of the mass acts very conveniently for this purpose and at the same time it has an effect of retarding evaporation of water as well. Other methods of preventing oxidation may be employed at this stage, such as conducting the steeping process in an atmosphere of carbonic acid gas. The mass is now pressed and separated from the liquid portion which contains the active principle. The mass is again steeped for hours in warm water slightly acidulated with acetic or hydrochloric acid, in order to extract the residual amount of active principle. The liquid separated from the mass is now added to the first extract and allowed to separate from the oil. The clear extract is now evaporated in a vacuum pan to a suitable strength. To this concentrated solution about two to three times its own volume of strong ethyl alcohol is added, or more economically wood spirit, which will precipitate both inert organic and inorganic substances. The inert substances thus separated are washed with alcohol so as to free them from the active principle. The alcohol solution is now evaporated preferably in vacuum still, whereby the alcohol used is duly recovered. To the residual liquid, ammonia is now added until the

solution gets distinctly alkaline and left over for several hours. A yellow brownish precipitate will be formed which is the crude adrenalin in a basic form. The precipitate is now filtered, washed with water and dried. The impure adrenalin usually precipitates in a light yellow brownish tomato-shaped form, but not infrequently in needles. The former is an agglomeration of needle crystals and is more or less contaminated with coloring matters and some inorganic substance, chiefly phosphates.

Instead of using ammonia, sodium hydrate may be used as a precipitant, but care must be taken not to use in excess, which redissolves adrenalin. In order to counteract caustic alkali, ammonium chloride or carbonic acid may be conveniently used. In fact, the various modifications and combinations of these processes may be adopted.

For the further purification of the adrenalin, the crude adrenalin is dissolved in acid and alcohol and ether is added to a sufficient quantity. A brown colored precipitate is produced which chiefly consists of coloring matter and inorganic impurities. The precipitate is separated both by decantation and filtration. The filtrate is now treated by one of the above-mentioned processes, when white crystalline precipitate of adrenalin will be obtained. It is quickly filtered, washed with water and then with alcohol and dried. The process of purification may be repeated, if desired, two or three times.

Properties and Deportments:—

Adrenalin is a light white, micro-crystalline substance, having, so far, observed to separate in five different forms of crystals according to the condition of solutions from which they be crystallized: 1. Prisms; 2. Fine needles; 3. Rhombic plates; 4. Boat or leaf-shaped; 5. Wart like.

Adrenalin has a slightly bitter taste and leaves a numb feeling on the tongue where it has been applied. In dry form it is perfectly stable. Adrenalin shows weak alkaline reaction on moistened litmus paper. Phenolphtalein also indicates slight alkalinity. It is soluble with difficulty in cold water and more readily in hot water. From the hot saturated aqueous solution the crystals separate on cooling. The colorless aqueous solution of adrenalin is prone to oxidation, absorbing oxygen from air and assuming colors from beautiful pink to red and eventually brown. It is easily soluble in

acids, and alkali hydroxides, forming salts. Ammonia and alkali carbonate do not dissolve adrenalin. Adrenalin solution made alkaline with alkali hydroxides and carbonates as well as alkaline earth hydroxides, readily absorbs oxygen from air, its rapidity being exactly proportionate to the strength of alkalinity.

The following are some of the characteristic reactions: Ferric chloride colors adrenalin solution emerald green, while iodine imparts a vivid pink, as first observed by Vulpian. A careful addition of caustic alkali to the green solution colored by ferric chloride, gives rise to the various shades of hue ranging from purple to carmine red, which is destroyed by careful neutralization with acids, restoring its original color. Oxydizing agents such as nitric acid, potassium bichromate and ferricyanide, etc., behave in a similar manner as iodine does. Gold chloride is very energetically reduced by adrenalin and a complete separation of the metal follows, from acid solution, by application of gentle heat; resultant liquid is colored pink or carmine red according to the strength of the solution used, as is the case with different oxydizing agents.

None of the following alkaloidal reagents produce precipitation: Mercuro-potassium iodide, picric acid, tannic acid, phosphomolybdic acid, phospho-tungstic acid, mercuric chloride, lead acetate, potassium bichromate and platinum chloride.

Analyses of Adrenalin:—

Combustions of adrenalin had been made in my laboratory and the following results were obtained:—

	I.	II.	III.	IV.	Average.
C	59·54	59·33	59·40	59·28	59·38
H	7·99	8·13	7·62	7·62	7·84
N	8·40[1]	8·13	7·74	7·76	7.88
O					24.94
					100.00

The probable empirical formula of adrenalin, calculated out of the above figures as basis, is $C_{10}H_{15}NO_3$.

100 parts of adrenalin needs nearly 19 parts of hydrochloric acid in forming a neutral salt and this substantiates the approximity of correctness of the formula, for 100 parts of the substance requires, by calculation, exactly 18·5 parts of HCl.

[1] The figure of N under No. I, was roughly estimated by the Kjeldahl method with the intention of having an approximate amount of nitrogen and therefore may not be regarded as accurate.

T. B. Aldrich, of Detroit, reported in his paper (August number of the *American Journal of Physiology*) that he had also succeeded in the isolation of the crystalline active principle of the suprarenal glands by the use of basic acetate of lead as a precipitant, and later by ammonia. He proved by analysis that his substance was exactly identical with my adrenalin.

Aldrich's formula is $C_9H_{13}NO_3$, which differs with mine by less CH_2. Aldrich observes that "if we subtract a benzoyl residue C_7H_5O from Abel's formula for epinephrin ($C_{17}H_{15}NO_4$) we obtain $C_{10}H_{10}NO_3$," which is not very far from Aldrich's own result.

It will be of some interest to arrange tabularly the empirical formulas of the glandular active principle, according to the results and claims by different authors:

Furth.	Abel.	Aldrich.	Takamine.
$C_5H_7NO_2$ or $C_5H_9NO_2$.	$C_{17}H_{15}NO_4$	$C_9H_{13}NO_3$	$C_{10}H_{15}NO_3$

The further investigations on different chemical behaviors of adrenalin will help to determine the correct formula for this interesting product.

Salts: Adrenalin is very soluble in acids and alkalies, and forms its salts which are not crystallizable. I made three kinds of salts—hydrochloride, sulphate and benzoate—by carefully dissolving adrenalin with the acids respectively and evaporating in vacuo over strong sulphuric acid. In the long course of time they all became dark brown, brittle masses, deliquescent in the air. So far my efforts to crystallize them have failed.

Alkali compounds are easily affected by oxygen of air and their crystallization is entirely impossible.

Benzoyl Compounds: Pure adrenalin is dissolved in a slight excess of an alkali solution, in a separating funnel, and benzoyl chloride is gradually added, shaking the contents briskly after each addition. After shaking a quarter or half an hour a yellow-brownish oily liquid will settle on the bottom of the funnel, and supernatant liquid will be found suspending some crystalline substance, and reacts no longer with ferric chloride, after acidulating with hydrochloric acid, showing that adrenalin has entirely combined with benzoyl by the manipulation. The oily liquid is first washed with water, and then with a diluted sodium carbonate solution, followed

with repeated washing with cold water until it is no longer alkaline. This oily substance had been kept over several months, still it showed no signs of crystallization but dried up to a transparent amber colored brittle mass.

I have tried it with different solvents in view of crystallizing but thus far in vain, and concluded that this portion of the benzoyl compounds is not crystallizable.

The other portion of the benzoyl compounds is crystalline, but without any defined form, and dissolves very easily in ether and alcohol, from which solution again the similarly formed substance can be obtained by evaporation of either alcohol or ether.

Analyses of both compounds are not yet finished on account of lack of pure substance, but I hope I will be able to report before long.

Action of Potassium Hydroxide on Adrenalin: To caustic potash, fused in a silver dish at as low temperature as possible, adrenalin (about one-quarter in weight) is carefully added when the mass will swell up, emitting noxious odor which partly has the smell recalling homologous pyridins. As soon as the swelling subsides and the mass uniformly fuses, the dish is removed from fire and cooled and then dissolved in water. This aqueous solution is now shaken with ether which takes up a substance which discharges a peculiar penetrating odor of indol or skatol, but substance is in such a small quantity that prohibits further manipulations for chemical proof. I think it is proper to attribute this production of skatol or indol smelling substance to the contamination of albuminous matters which is practically unavoidable in case of crude adrenalin.

The portion separated from ether is acidulated with hydrochloric acid and again shaken with ether which leaves beautiful needle crystals on evaporation. These crystals are the mixture of two substances with almost similar reaction toward ferric chloride. On determining the melting point of the crystals respectively, it was found that one melts at about 100° C. while the other melts at about 190° C. Both are easily soluble in water as well as in alcohol. Ferric chloride colors the solution of the crystals a beautiful emerald green which turns red by careful addition of sodium carbonate solution. Silver nitrate and Fehling's solution are reduced by them and lead acetate produces a voluminous precipitate.

I could not obtain enough quantity of both crystals, so as they

can be subjected to analyses; but as far as their chemical reactions and melting points are concerned there is little doubt to believe that the mixture consists of protocatechuic acid and pyrocatechin. The former is easily changed to the latter while the fusion is going on. Surmising chief production by the potash fusion be protocatechuic acid, it may be possibly right to conclude that in adrenalin molecule there is such a residue, $C_6H_3(OH)_2$—as is linking to the other residue $C_4H_{10}NO$. I cannot at present furnish chemical proof for the above supposition but hope to continue further investigation during this winter, when the material can be obtained and manipulated without any fear of deterioration, and report on the results.

Physiological Properties: The physiological activity of adrenalin thus isolated is astoundingly strong. A fraction of one drop of aqueous solution of adrenalin or its salt in strength of 1 : 50,000 blanches the normal conjunctiva within one minute. It is the strongest hemostatic agent known.

The intravenous injection of adrenalin produced a powerful action upon the muscular system in general, but especially upon the muscular wall of the blood vessels and the muscular walls of the heart, resulting in an enormous rise of blood pressure. The result of three intravenous injections of 1 c.c. of the solution of adrenalin chloride of 1 : 100,000 into a dog weighing 8 kilograms raised the blood pressure corresponding 30 millimeters of mercury.

The above result, as well as other experiments, indicates that adrenalin is over one thousand times stronger than the fresh glands.

The therapeutic applications of adrenalin are already numerous and new uses for it are constantly found by investigators. Generally speaking, adrenalin when locally applied is the most powerful astringent and hemostatic known. It is useful in all forms of inflammation and is the strongest stimulant of the heart. It is non-irritating, non-poisonous, non-cumulative and without injurious properties. It has been used with good results as an antidote in morphin and opium poisoning, in circulatory failure, in the prevention of collapse in anesthesia, and in allied conditions. It is invaluable in carrying out bloodless operations in nose, eye, ear and throat work. It has also given good results in some cases of deafness, hay fever, nasal hemorrhage and various forms of heart disease. Such authorities as Doctors Mayer, Wilson, Bates, Reichert, Ingals, Stucky, Chambers, Curtis, Swain and many others have reported very favorable results.

The therapeutic efficacy of adrenalin has already been established beyond doubt, and it will unquestionably obtain a prominent place in the materia medica.

There are several useful applications of adrenalin in arts and industry; for instance, a developer of photographic plates, as a reducing agent in chemical analysis, art of dyeing, etc.

In concluding this paper, I desire to state that my thanks are due to Dr. E. M. Houghton, of Detroit, for making the physiological test, and also my thanks and large share of credit are due to Mr. Wooyenaka, my associate, for his energetic and able assistance in accomplishing this interesting investigation.

THE PHARMACOLOGIC ASSAY OF PREPARATIONS OF THE SUPRARENAL GLANDS.[1]

By E. M. Houghton, M.D.

Since Adison, in 1855, called attention to the relation of pathological lesions of the suprarenal glands to the disease which has since borne his name, these bodies have been the subject of numerous researches by workers in all lines of medical science. The histologist, the chemist, the physiologist and pharmacologist has each contributed his share to the sum total of the results obtained, which, often enough, have been widely divergent. But it is not my purpose to review the history of this interesting subject. It may be remarked, however, that for the first forty years the active principle found in these glands was the plaything of science, then leaped into prominence when Bates discovered that it could be employed as an astringent in ophthalmology, since which time physicians are finding new uses for it almost daily. In the course of some experimental work on the pharmacology of the adrenals, it appeared possible to take advantage of the marvelous influence of the active principle contained in extracts of these bodies upon the blood pressure which had been observed by Oliver and Shafer as a means of measuring their activity. Furthermore, it seemed quite advisable, as we had no chemical means of standardizing them, that some method of assay should be found, since in all probability in keeping with products of similar nature there must be much variation in the

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[1] Presented at the St. Louis meeting of the American Pharmaceutical Association, September, 1901.

pharmacologic activity, owing to the liability to undergo chemical or bacteriological decomposition before, during, or after manufacture, in the various products that were to be obtained on the market.

Believing that the results of my observations may be of some interest to members of the Association, I will briefly outline the method that has given me the best results. This method is based upon the changes produced in the blood pressure of the carotid artery when variable quantities of a given preparation of the suprarenal glands dissolved in slightly acidulated water, the inert substance being removed as far as possible, are injected into the femoral, or jugular vein, of an anaesthetized dog or other animal.

The apparatus required are an operating table suitable for experi-

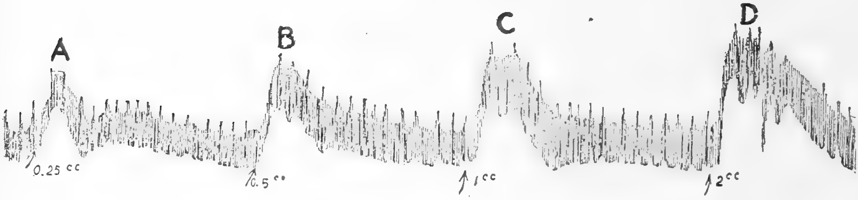

Fig. 1.—Blood-pressure tracing taken from the carotid artery of a dog anesthetized with chloretone. Suprarenal liquid diluted with normal saline solution to 5 c.c. in each instance was slowly injected into the femoral vein.

When injected into the circulation the principle of the suprarenal gland causes a marked temporary rise in the blood-pressure. The height of the waves in the above tracing (indicating the amount of pressure in the carotid artery) is directly proportionate to the quantity of adrenalin injected in each instance. For example, at *A* is shown the effect of the administration of 0·25 c.c. of suprarenal liquid; at *B*, of 0·5 c.c.; at *C*, of 1 c.c.; and at *D*, of 2 c.c

menting on dogs, and such surgical instruments as are usually found in physiological and pharmacological laboratories, including small glass conulae, suitable for inserting in blood-vessels and veins and a syringe of 10 c.c. capacity. A large-sized kymograph, with manometer arranged for taking blood-pressure tracings on continuous rolls of white paper, with ink pens, or fitted with the more convenient smoked-paper sheets, upon which the results are traced with a stylus is required. In either case, whether smoked or unsmoked paper is employed, for convenience in making measurements of the height of the blood-pressure tracings, the paper should have linear rulings, five millimeters apart.

The method is as follows: A small or medium-sized dog is care-

fully anaesthetized with chloroform, ether or chloretone. I have used the latter drug almost entirely, as but one dose, which is given per stomach, is required. In from fifteen to thirty minutes the animal is thoroughly anaesthetized, and will remain entirely insensible to pain for any length of time. Another decided advantage possessed by this anesthetic over chloroform and ether for laboratory work is the fact that the blood-pressure remains constant for many hours. After the animal is completely anaesthetized he is placed on the operating table, and glass conulae of suitable size are tied, as quickly as possible, into the carotid artery and femoral vein, the vessels being clamped off previously with forceps. The conula in the artery is connected to an inelastic tube, completely filled with a half-saturated sodium carbonate solution to prevent the blood from clotting by means of a short piece of rubber tubing, great care

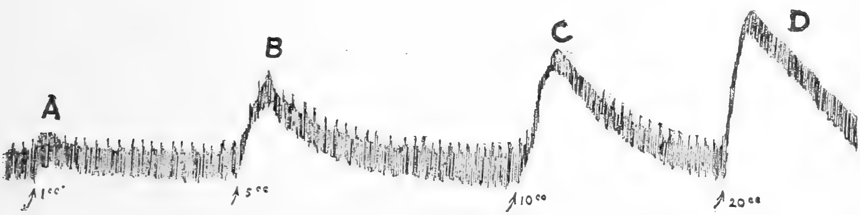

Fig. 2.—Blood-pressure tracing obtained in the same manner as No. I. Suprarenal liquid solution was, however, more dilute than that employed in No. I.

being exercised to exclude all air. The other end of the inelastic tube terminates in a U-shaped glass manometer tube which is partly filled with mercury, which has resting upon its free surface a glass float tipped with a glass writing pen or stylus. As soon as all the connections are made between the artery and manometer, the clamp employed to prevent the flowing of blood from the vessel is removed and immediately the float bearing the writing instrument begins to rise and fall in unison with the beats of the heart. The recording drum, which has been carefully placed in contact with the writing instrument, is released at the same moment and a graphic record of the blood-pressure and heart beats is made upon the traveling sheet of paper. A few inches of record are taken as a normal tracing. Then a quantity of the solution of the preparation of the suprarenal glands, representing a known quantity of the product, is injected into the vein, through the other glass cornula, care being

again exercised to prevent the entrance of air into the vessel. Within a few moments after the injection the blood-pressure is enormously increased, but it quickly falls again to the normal. As soon as the blood-pressure has become normal a second injection is made in precisely the same manner, of a known quantity of the standard solution of the suprarenal gland. Again increased blood-pressure results. A comparison of first and second tracings will show whether more or less of the solution being assayed should be injected to produce the same rise in blood pressure as is produced by a given amount of the standard preparation. Ultimately, by repeating the injections, the requisite amount of the preparation being assayed will be found which will produce a rise in blood-pressure equal to that produced by a given quantity of the standard. The extent of the rise in blood-pressure varies in proportion to the amount of the active constituent of the suprarenal gland injected. Several dogs are usually required for making an assay. Two kinds of tracings may be made. Complete when the drum of the kymograph is allowed to run continuously, and abbreviated when the drum remains stationary, while the reaction takes place. In the latter the rise in blood-pressure is recorded as a short, perpendicular line. These abbreviated tracings answer admirably for most work, as only variations in blood-pressure are taken into account. The smoked paper tracings are fixed by dipping them into shellac, and allowing them to dry. A great many precautions must be observed in carrying out the experiments, such as the amount of material injected at one time, since the extent of the increase in blood-pressure must be sub-maximal, the volume of fluid injected at one time, the length of time required in making the injections, etc., but in keeping with all other methods of pharmacologic assay the conditions obtaining in the experiments must be kept constant and the reaction of the preparation being assayed must be compared with a known standard.

Naturally the question will arise as to what should be the standard. At first a freshly prepared fluid extract of fresh bovine suprarenal glands was employed as a standard, but after the isolation of the active constituent, adrenalin, I adopted it as a standard, because its activity remains constant while other preparations of the suprarenal glands are prone to undergo decomposition, and consequent alteration in strength. The animals, after the experiments are concluded,

are immediately killed. Since the dogs are procured from the pound, and killed by an anesthetic instead of drowned, there should be no trouble with the humane societies.

The accuracy of the results obtained by the application of this method depend, like those of quantitative methods, generally upon the skill of the operator and attention to details. As a specific example of the results that may be obtained, the following illustration will suffice: Three samples of adrenalin, of known but concealed strength, were prepared and assayed. Calling the standard 100 per cent., the unknowns contained 40, 85, and 130 per cent., respectively. The results reported were 40, 83, and 135 per cent.

DIGESTIVE FERMENTS IN SURGICAL PRACTICE.

WITH THE FORMULA OF A PEPSIN SOLUTION, USED AT THE GERMAN HOSPITAL, PHILADELPHIA.

By M. I. Wilbert.

The local application of digestive ferments, to dissolve the coagula and putrescent matter found in lesions, or the products of morbid changes in the living human organism, is not new. Especially is this true of the vegetable ferment derived from a South American species of papaw. The proprietary preparations made from the milky exudation of this plant have been recommended, and used quite extensively, to dissolve the false membrane in cases of diphtheria. This same class of preparations has also been used to some extent for external application, to aid in cleaning out disagreeable sloughing ulcers, by dissolving the broken down granulations and albuminous exudate that offer both shelter and food for colonies of micro-organisms.

The latter use of this vegetable ferment is evidently a very old one, and borrowed from the practices of savage or semi-savage races. Mr. F. B. Kilmer in "The Story of the Papaw," published in recent numbers of The American Journal of Pharmacy, relates how the native South American doctors use a paste, made up with the juice of the papaw, as one of its chief ingredients, as a dressing for foul ulcers and offensive sores that occur among the natives in hot climates.

While this vegetable ferment has the decided advantage of being active in either an acid, neutral or alkaline medium, and, theoret-

ically at least, should have a very wide field of usefulness, nevertheless it has several disadvantages that are quite a drawback to its general adoption in surgical, or even medical practice. One is the very high price demanded for the different commercial preparations. Another is the variation that exists in the digestive powers, of the different preparations on the market, and even among different samples of the same brand. And, in addition to this, we have no satisfactory way of making a fluid preparation of this drug that will offer any reasonable assurance of retaining the active principle of the drug unimpaired.

The animal digestive ferments have been so improved during the past twenty years through the scientific study of their physiological and chemical properties, and by improvements in methods of manufacture, that the proteolytic powers of pepsin for instance has been raised from 1·29 to 1·3000 and, according to the statements of some manufacturers, a pepsin having the power of digesting 15000 times its weight of coagulated egg albumen is not only possible, but is actually an article of trade at the present time. This improvement in the quality of these ferments would appear to open many interesting possibilities for their use, that as yet are not fully developed. If we remember the factors that are necessary for the digestion of albuminous proteids by the peptonizing enzyme we find that all the necessary conditions can readily be secured in a wound, ulcer or abscess of the living human body, and there need be little wonder therefore that the manufacturers of animal digestive ferments appear to have recognized the possible advantages to both patient and surgeon, that are to be obtained from the use of a peptonizing enzyme, as a physiological solvent for cleaning out abscesses, indolent ulcers and necrotic areas. And several more or less efficient preparations, put up especially for external application, are on the market at the present time.

It will readily appeal to all that a solvent that will attack and destroy necrotic tissues, without injuring the surrounding healthy cells, offers distinct advantages over corrosive or poisonous antiseptics, or caustic washes that at best only tear away or remove the superficial layers of dead cells, or if they do work down into the deeper tissues, poison and destroy many of the healthy living cells, and in this way accomplish more harm than good.

For the same reasons such a physiological solvent would appear

to offer many advantages over the use of the curette, for, while it is practically impossible to remove all the debris from a wound by mechanical means, without injuring and scraping away much of the healthy tissue, we can, by means of digestive ferment, remove all foreign or dead material, without injuring the vitality of the surrounding living cells, but, what is of more importance, it can be done without causing any appreciable amount of pain or discomfort.

A pepsin solution that has some resemblance to at least one of the commercial preparations, has been in use in the out-patient department of the German Hospital for some time, and appears to be giving very good satisfaction.

Mixed with two or three times its volume of water, and applied as a wet dressing, it has given excellent results by removing the broken down granulations and other septic materials from old chronic ulcers and abscesses, leaving a healthy granulating surface that may be treated as a clean wound in the regular way.

Following up our practice of giving a descriptive title or name to preparations having distinctive characteristics, we have christened this particular solution "Physol," this being a combination of the first syllables of the two words "Physiological Solvent" that describe better than lengthy phrases what the solution is really intended for, and what it will do.

The formula for this preparation, as used by us, is as follows.

	Grammes.
Pepsin (U.S.P.)	50·
Menthol	0·5
Eucalyptol	0·5
Oil of wintergreen	0·5
Alcohol	10·
Glycerin	50·
Diluted hydrochloric acid	20·
Talcum	50·
Distilled water to make	1000.

Dissolve the pepsin in 800 c.c. of distilled water, add the diluted acid and the glycerin, then dissolve the menthol, eucalyptol and oil of wintergreen in the alcohol and add this solution to the pepsin mixture. Add sufficient water to make the volume of the solution 1000 c.c., add the talcum and shake thoroughly, then filter through paper, returning the first portions until the filtrate runs perfectly clear.

The resulting solution is a clear, light yellow and pleasantly aromatic solution that appears to keep, without any appreciable change in its peptonizing properties.

THE ANATOMY OF THE FRUIT OF COCOS NUCIFERA.[1]

By A. L. Winton.[2]

(Contribution from The Connecticut Agricultural Experiment Station, New Haven, Conn.)

I. MORPHOLOGY AND MACROSCOPIC STRUCTURE.

Since the general structure of the cocoanut fruit has been treated by numerous writers on systematic and economic botany, only such facts are here given as are essential for a clear understanding of the relation of the parts and the microscopic structure.

The flowers are arranged in spikes branching from a central axis and inclosed within a tough spathe usually a meter or more in length (*Fig. 1*). A single female flower is borne near the base of each lateral axis, and numerous male flowers are distributed on all sides of the axis between the female flower and the apex. After the male flowers drop, each naked lateral axis persists and is a prominent appendage of the fruit (*Figs. 2* and *3 S*). Only one ovule of the three-celled ovary comes to maturity, but the tricarpelary nature of the fruit is indicated by its triangular shape as well as by the longitudinal ridges and the three eyes or germinating hole of the nut.

The epicarp of the fruit (*Fig. 3, Epi*) is a smooth tough coat, of a brownish or grayish color.

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[1] Reprinted from *The American Journal of Science*, Vol. xii, October, 1901.

[2] European microscopists have studied the foods and adulterants which have come under their observation but have overlooked a number of distinctly American products. The writer has undertaken to fill in some of these gaps by a series of papers, of which this is the second. The first paper, on the anatomy of maize cob, was published in the *Oesterreichische Chemiker-Zeitung*, 1900, p. 345, and also in the Conn. Experiment Station Report, 1900, p. 186.

Each paper will describe from the purely scientific standpoint the macroscopic and histological structure of the material investigated, and also in a final chapter point out the application of this knowledge to the detection of adulteration. The last chapter is not strictly suited to the pages of this Journal, but is so dependent on the scientific descriptions which precede it that it would be almost valueless if published separately.

FIG. 1. Infloresence of the cocoanut showing spathe inclosing the spikes each with numerous male flowers above and a single female flower near the base. $\times \frac{1}{5}$.

FIG. 2. Half grown cocoanut fruit with calyx, and axis from which the male flowers have fallen. $\times \frac{1}{5}$.

FIG. 4. Inner surface of a cocoanut shell with adhering outer testa. At the left the raphe, from which proceed veins forming a network over the surface. $\times \frac{1}{5}$.

The mesocarp (*Fig. 3, Mes*), consists of a hard outer coat but a few millimetres thick and a soft portion, usually 3–4 c.m. thick, on the sides and much thicker on the base. Imbedded in the mesocarp are numerous longitudinally arranged fibers, varying in size from slender hairs to large, sparingly branching and anastomosing, flattened forms, 2–3 m.m. broad. The large fibers are situated chiefly in the inner layers, with their flat surfaces parallel with the surface of the nut.

Oftentimes the inner layers of the mesocarp become impregnated with a brown fluid, which on drying, gives the thin tissue a mottled brown appearance.

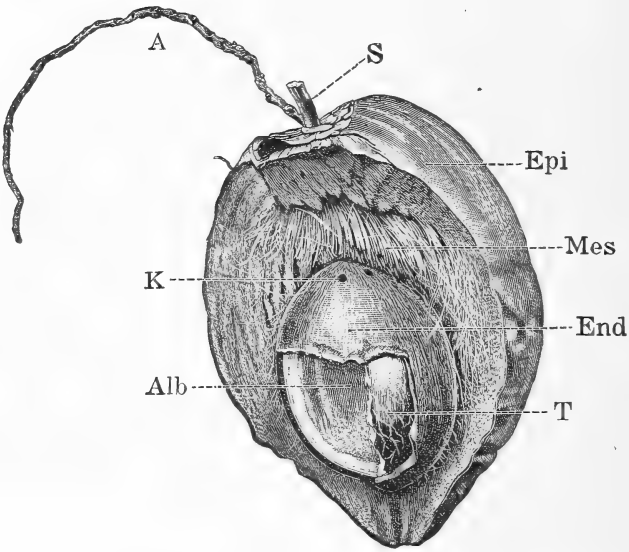

FIG. 3. Ripe cocoanut fruit. *S*, lower part of axis forming the stem; *A*, upper end of axis with scars of male flowers; *Epi*, epicarp; *Mes*, mesocarp with fibers; *End*, endocarp or hard shell; *T*, portion of testa adhering to endosperm; *Alb*, endosperm surrounding cavity of the nut; *K*, germinating eye. × $\frac{1}{5}$.

The endocarp, or shell (*Fig. 3, End*), consists of a hard, dark brown coat, 2–6 m.m. thick, with numerous fibers adhering to the surface. Three nearly equidistant ridges (often indistinct) pass from base to apex, where they unite to form a blunt point. At the basal end, between the ridges, are the three depressions or eyes, the tissues of which are much softer and thinner than of the rest of the shell (*Fig. 3, K*). Through the softest of these eyes the embryo,

embedded in the endosperm directly behind it, escapes in sprouting.

The testa of the anatropous seed (*Fig. 3, T,* and *Fig. 4*) is a thin coat of a light brown color, closely united with the endocarp without and the endosperm within. Embedded in the outer portion and extending from the principal eye nearly to the apex is the raphe, consisting of a thin band of vascular tissues about 1 c.m. broad, which sends off branches in all directions, forming a network about the seed. The endosperm with the inner portion of the testa may be separated from the outer testa and endocarp by introducing a knife blade between the layers. By this operation the veins are split, part of the vascular tissue adhering to the convex surface of the inner testa, and the remainder to the concave surface of the outer testa, so that both surfaces are covered with reticulations.

The endosperm or meat of the cocoanut (*Fig. 3, Alb.*) is a white, fleshy layer, 1–2 c.m. thick, in which, near the base, is embedded the small embryo. While immature, the nut is filled with a milky liquid and has no solid endosperm, but as the ripening proceeds the endosperm is gradually formed and at the same time the milky liquid diminishes in quantity or entirely disappears.

Cocoanuts yield food for man and cattle, oil, fiber, and other useful products. The epicarp and mesocarp are cut away from nuts designed for export, although invariably a small amount of the mesocarp with its fibers remains attached to the shell. In removing the meat, the outer testa, as has been stated, also adheres to the hard shell, so that cocoanut shells consist not merely of endocarp, but also of a certain amount of mesocarp and testa.

II. HISTOLOGY.

The microscopic structure of the cocoanut seed is described by Hanausek,[1] Harz,[2] Moeller,[3] Koenig[4] and other authorities on foods and applied microscopy.

Cocoanut fiber (coir), which has long been extensively employed

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[1] *Die Nahrungs- und Genussmittel aus dem Pflanzenreiche*, Kassel, 1884, p. 155.

[2] *Landwirthschaftliche Samenkunde*, Berlin, 1885, p. 1120.

[3] *Mikroscopie der Nahrungs- und Genussmittel aus dem Pflanzenreiche*, Berlin, 1886, p. 241.

[4] *Die Untersuchung landwirtschaftlich u. gewerblich wichtiger Stoffe*, Berlin, 1898, p. 291.

in making mats and cordage, and also cocoanut shell, which has been used for making knobs and other turned articles, were studied by Wiesner[1] nearly thirty years ago, but his work was designed chiefly to distinguish the fiber from other commercial fibers and the shell from the similar shell of *Attalea funifera.*

Von Hoehnel[2] describes briefly the histology of coir, but, like Wiesner, does not appear to have understood the true nature of the stegmata.

Weiss,[3] Engler and Prantl,[4] and some other authors refer briefly to the microscopic structure of parts of the cocoanut, but their descriptions are of little value in diagnosis.

1. *Epicarp.*

The epicarp or epidermal layer is about ·015 m.m. thick and is made up of tabular cells with dark brown contents. In surface view the cells are usually square, rectangular or triangular, with double walls about ·005 m.m. thick and are arranged with some regularity in rows.

2. *Mesocarp.*

(*a*) *Hard ground tissue.*—This tissue consists of thick-walled cells which are often tangentially-transversely elongated. In the first few layers the walls are about the same thickness as in the epidermis, without evident pores, but further inward they are more strongly thickened (double walls often ·015 m.m. thick) and conspicuously porous. Still further inward they pass into the parenchyma of the soft ground tissue.

(*b*) *Bast-fiber bundles.*—In the hard ground tissue the bundles have no phloem or xylem but are composed entirely of bast-fibers with cell walls often thicker than the lumen. The number of fibers seen in cross section varies from two or three up to a hundred or more. Transitional forms between fibrous and fibro-vascular bundles occur further inward.

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[1] *Die Rohstoffe des Pflanzen-Reiches*, Leipzig, 1873, pp. 436 and 789. (A new edition is being published in parts, but the chapters on the cocoanut have not yet appeared.)

[2] *Die Microscopie der technisch verwendeten Faserstoffe*, Leipzig, 1887, p. 52.

[3] *Anatomie der Pflanzen*, Wien, 1878, 1 Band.

[4] *Die natürlichen Pflanzenfamilien*, II Theil, 3 Abteilung, p. 22.

(*c*) *Soft ground tissue.*—The thin-walled parenchyma cells of the soft ground tissue are in some parts isodiametric, in other parts longitudinally elongated, and in still other parts transversely-tangentially elongated (*Fig. 8, w*). Wherever the brown liquid previously referred to has penetrated the inner layers of the mesocarp, groups of the parenchyma cells here and there, being impregnated with this material, are of a rich brown color and appear thicker-walled than the others (*Fig. 8, br.*). This brown substance is quickly changed to a reddish color by caustic potash, but is not affected by alcohol, ether or the specific reagents for proteids, fats and resins. No immediate effect is produced by ferric chloride solution, but on long standing the color is changed to olive green.

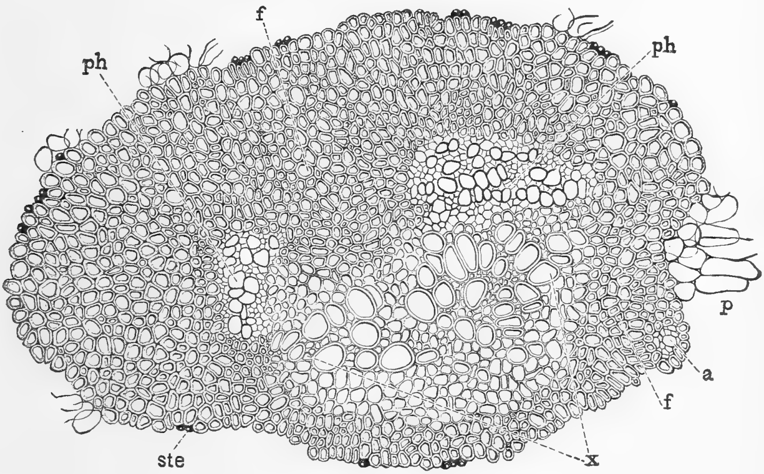

FIG. 5. Transverse section of a large flattened (mesocarp) fiber of the cocoanut. *ste*, stegmata ; *f*, sheath of bast fibers ; *ph*, two phloem groups ; *x*, xylem ; *p*, parenchyma of ground tissue ; *a*, rudimentary bundle belonging to small branch. $\times$ 90.

(*d*) *Fibers* (*Coir*).—These are fibro-vascular bundles with a strongly developed sheath of bast-fibers. Toward the xylem side of the bundle, particularly in the large fibers, the sheath usually diminishes in thickness and the vascular portion, as seen in cross section, is more or less eccentric, surrounded by a crescent-shaped sheath with the horns connected by a narrower strip.

In the smaller fibers there is but one group of phloem elements, but in the larger flattened fibers there are usually two, or occa-

sionally more, groups separated from each other by a continuation of the sheath (*Fig. 5*). Normally the xylem is near the inner flat side and the two phloem groups are approximately symmetrical with reference to the shorter axis of the elliptical cross section; but often the xylem is near one of the narrow sides and the phloem groups are symmetrical with reference to the longer axis, and still more often the arrangement is diagonal or otherwise irregular.

Mohl[1] in 1831 noted that the phloem in the stem of *Calamus* was normally divided into two distinct groups, and Kny[2] as well as other authors have since found the same arrangement in a number of palms. By the study of many sections, the writer has demonstrated that a cocoanut fiber with two phloem groups has also a double xylem, although in most sections no separation is evident, and the whole fiber consists of two simple bundles united side by side, which may completely separate further on in their course by the forking of the fiber.

Serial sections cut through such compound fibers show that at the place of forking the phloem groups are still further separated and the xylem also is divided by bast-fibers, thus forming two distinct bundles which pass into the two branches. The phloem in each branch is at first entire, but further on, if the branch is large it usually divides, and still further on the whole bundle may split up, with the formation again of two fibers. Occasionally a fiber which has no evident division of the xylem has four groups indicating that the fiber is composed of four united bundles, which, on branching, form two fibers each with a double bundle.

Large fibers not only fork but also send off small lateral branches. The rudimentary bundles belonging to such branches may often be seen in cross sections of the trunk fiber below the place of branching (*Fig. 5, a*).

a. Stegmata (*Figs. 5* and *6, ste*).—As seen in surface view these are circular or elliptical cells from ·008 to ·020 m.m. in diameter, which extend in longitudinal rows over the surface of the fibers. Longitudinal sections show that the cells are biconvex, fitting into depressions in the bast-fibers, and that the outer walls are exceedingly thin, while the inner and side walls are strongly thickened,

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[1] *De Palmarum Structura*, Translation in Ray Soc. Reports and Papers, 1849, p. 29.

[2] *Verhandl. d. Bot. Ver. Prov. Brandenburg*, Bd. xxiii, 1881, pp. 94–109.

thus bringing the cell cavity near the outer sufrace. Inclosed in each cell and filling it almost completely, is a silicious body, from ·006 to ·012 m.m. in diameter, with wart-like protuberances on the surface which fit into corresponding depressions in the cell walls (*Fig. 7*). That they are composed of silica is demonstrated by their incombustibility, their insolubility in hydrochloric and nitric acids and their complete solubility in hydrofluoric acid. Their appearance is particularly striking in tangential sections which have been heated on a cover glass until thoroughly carbonized and finally treated with hydrochloric acid on the slide. The heating

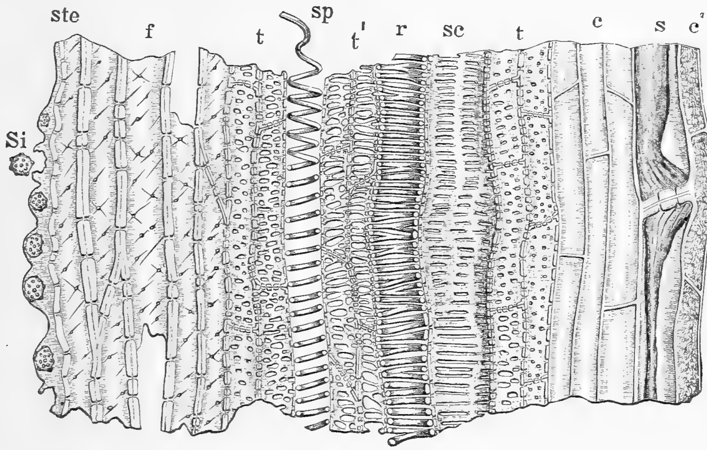

FIG. 6. Longitudinal section of a large (mesocarp) fiber of the cocoanut. *ste*, stegmata; *Si*, silicious body; *f*, bast fibers; *t*, tracheids with small pits; *t'*, tracheids with large pits; *sp*, spiral trachea; *r*, reticulated trachea; *sc*, scalariform trachea; *s*, sieve tube; *c* and *c'*, cambiform cells. $\times$ 300.

should be performed at dull redness, since at a higher temperature the bodies lose their characteristic appearance.

Wiesner[1] refers to these stegmata as "bast parenchyma," and from his description it would appear that he considered them *silicified cells* and did not understand that they are *sclerenchymatized cells* with *silicious contents*. Von Hoehnel,[2] who uses, however, the term "stegmata," also appears to have fallen into the same error.

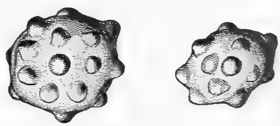

FIG. 7. Silicious bodies from the stegmata of cocoanut fiber. $\times$ 1500.

[1] *Loc. cit*, pp. 436–438.
[2] *Loc. cit.*, p. 52.

Rosanoff[1] found stegmata in twelve species of palms, and Kohl,[2] who has made an exhaustive study of the subject, in twenty-three additional species. Neither author mentions *Cocos nucifera*, but Kohl found in *C. flexuosa* stegmata with silicious contents which answer the description of those in coir fiber.

β. Bast-fibers (*Figs. 5* and *6, f*) completely surround the bundle. They vary in length up to 2 m.m. and in diameter up to ·03 m.m. The double cell walls are from one-half to one-sixth the breadth of the lumina, with conspicuous pores and diagonal markings. In longitudinal section the walls adjoining the stegmata are sinuous in outline, due to the depressions into which the stegmata are fitted. On the edge of the xylem the bast-fibers pass into tracheids (*Fig. 6, t*).

γ. Xylem (*Fig. 5, x; Fig. 6*). The elements are tracheæ, tracheids and various forms intermediate between tracheids and bast-fibers, and tracheids and parenchyma.

The tracheæ range in diameter up to ·05 m.m., the larger (found in large fibers) being reticulated (*Fig. 6, r*) or scalariform-reticulated (*sc*), the smaller (found both in large and small fibers) being spiral or reticulated spiral. Among the spiral tracheæ one finds considerable variation both as to their size and the steepness of their spirals. As might be expected, those in the protoxylem often have delicate spirals with turns wide apart. An intermediate form is shown in *Fig. 6* (*sp*).

The tracheids, distinguished from the tracheæ by the transverse or diagonal partitions and by their smaller size and thinner walls, likewise display an interesting diversity of size and form. Among these are forms with large pits and curious reticulations (*Fig. 6, t'*) also transitional forms between tracheids and bast-fibers (*t*) on the one hand, and tracheids and parenchyma on the other.

δ Phloem. Sieve tubes and cambiform cells make up the phloem (*Fig. 5, ph*).

Measured in cross sections, the diameters of the sieve tubes vary up to ·03 m.m. In longitudinal sections it may be seen that the sieve plates are either at right angles to the walls or oblique and that oftentimes they are covered with callus through which run a few indistinct pores (*Fig. 6, s*).

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[1] *Bot. Ztg.*, 1871, p. 749.

[2] *Kalksalze und Kieselsäure in der Pflanze, Marburg*, 1889, p 289.

Cambiform cells occur singly, in rows and in groups among the sieve tubes and also at the edges of the phloem. Those among the sieve tubes are for the most part small (about ·003 m.m. in diameter), prismatic and with abundant protoplasmic contents (*Fig. 6, c*[1]). They correspond to the "*geleitzellen*" of Wilhelm, Tschirch[1] and other authors except that the walls adjoining the sieve tubes, so far as the writer has observed, are not pitted.

At the edges of the phloem, particularly adjoining the xylem, the cambiform cells are larger (often ·01 m.m. in diameter) and are often empty. The differences between these forms are, however, so slight and perplexing that the writer, following the example of De Bary and Strassburger, prefers to group them all under the head of cambiform cells.

(*e*) Intercellular spaces, such as occur in the protoxylem of many monocotyledinous plants, are seldom, if ever, seen in coir fibers, but oftentimes, although less commonly than in the hard shell, the phloem and part of the xylem are destroyed during growth, leaving a channel in the bundle.

3. *Endocarp.*

This coat, known commonly as the shell (*Fig. 8, end*), is a dense aggregation of stone cells, among which run longitudinally partially destroyed bundles.

(*a*) *The stone cells* with their thick, deep yellow walls, branching pores, the dark brown contents, present a striking and characteristic appearance. They are either isodiametric or strongly elongated, the latter (often 0·2 m.m. long) being usually spindle or wedged-shaped, although hammer-shaped, hooked and various other curious forms abound.

A study of sections show that the elongated cells are arranged in groups, commonly with the longer diameters in tangential-transverse directions and are best seen in cross sections of the shell (*Fig. 8, qst*), but in some groups, particularly those adjoining the bundles, they pass longitudinally about the shell (*Fig. 9, lst*). It is evident from *Fig. 8* that more than half of all the stone cells are tangentially-transversely elongated. Those which appear isodiametric (*lst*) are partly cells which are isodiametric in three dimensions and partly longitudinally elongated cells in section.

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[1] See *Tschirsch, Angewandte Pflanzenanatomie,* Wien, 1889, p. 349.

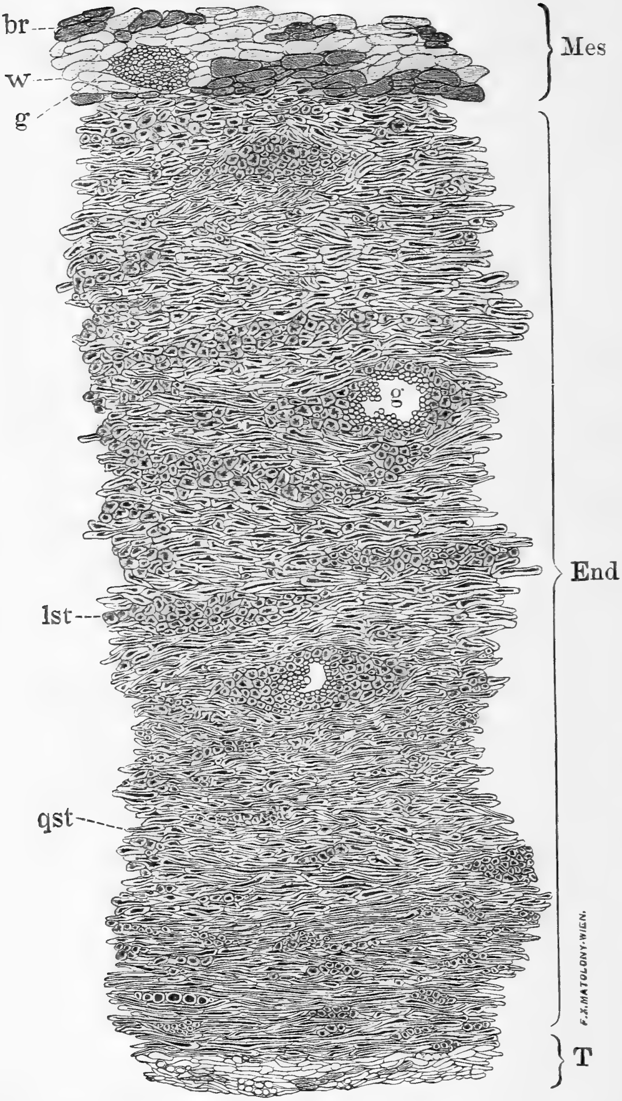

FIG. 8. Transverse section of a cocoanut shell. *End*, endocarp or hard shell; *Mes*, adhering mesocarp; *T*, adhering outer testa; *w*, colorless parenchyma of mesocarp ground tissue; *br*, same as *w* but impregnated with a brown substance; *g*, vascular bundles, in the endocarp with phloem and xylem partially obliterated; *lst*, longitudinally elongated and isodiametric stone cells; *qst*, transversely-elongated stone cells. × 60.

Groups of thinner-walled cells with dark brown contents are occasionally met with.

The brown contents of all the endocarp cells react the same as the brown impregnating material of the mesocarp.

(*b*) *Vascular bundles* are studied with difficulty in the mature shell. By the rupture of the phloem and part of the xylem during growth, passages are formed, which, in shells transversely cut or

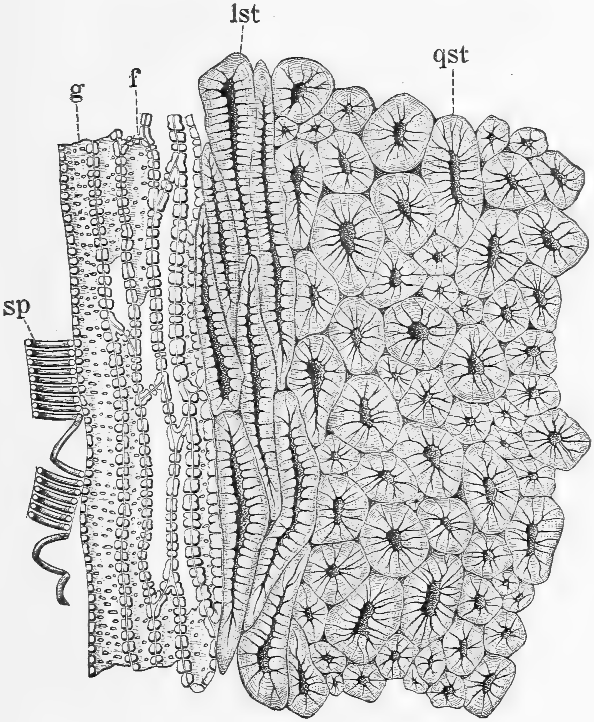

FIG. 9. Longitudinal-radial section of cocoanut endocarp through the stone cells and edge of bundle. *qst*, transversely elongated and isodiametric stone cells; *lst*, longitudinally elongated stone cells; *f*, thick-walled porous cells; *g*, pitted trachea; *sp*, spiral trachea. $\times$ 300

broken, are evident to the naked eye as minute holes. The structure of the bundles is still further obscured by the presence of fungus threads and spores.

In structure the bundles differ from those of the mesocarp fiber the bast-fibers being replaced by forms intermediate between fibers and tracheids (*Fig*, 9, *f*). The vascular elements are chiefly spiral

tracheæ (*sp.*), and pitted tracheæ (*g*), the latter being especially noticeable.

4. *Testa.*

Several microscopists have studied the testa, but, owing doubtless to differences in the material, hardly two of them agree as to the number of coats or the character of the elements. The description which follows is based on the examination of numerous specimens.

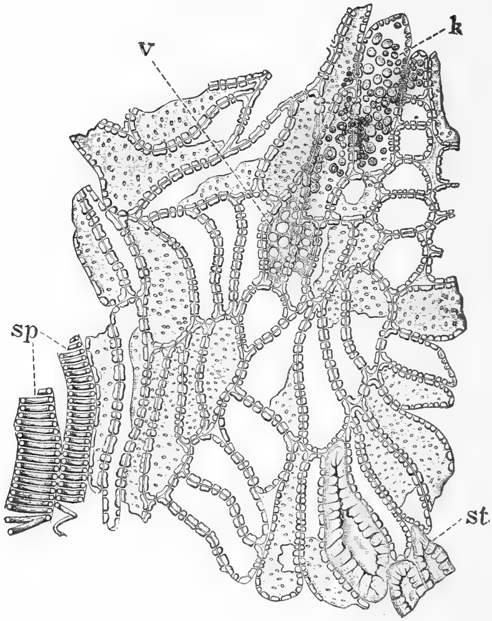

FIG. 10. Tangential section of the outer testa of the cocoanut showing the ground tissue of thick-walled porous cells. Most of these are empty, but a few contain brown contents in the form of globules, (*k*) or films with circular openings (*v*). *st*, colorless stone cell ; *sp*, spiral trachea. × 300.

(*a*) *Outer testa.* This coat consists of a ground tissue of large, variously shaped cells, crossing one another in all directions (*Fig. 8*, *T*, *Fig. 10*), between which ramify the veins.

Most of the ground tissue cells have colorless double walls, from ·004 to ·010 m.m. thick, with conspicuous (sometimes large) pores, but in the inner layers they often have thinner walls without evident pores and except for their shape bear no resemblance to the other cells.

As a rule, the cells are empty, but some here and there contain a brown substance apparently the same as is contained in the mesocarp and endocarp, which often takes the form of spheres (*Fig. 10, k*), disks, or films with circular openings (*v*).

Colorless stone cells (*Fig. 10, st*) are present in the outer layers and contrast strikingly with the deep yellow stone cells of the endocarp.

The conspicuous elements of the veins are spiral tracheæ, pitted tracheæ and elongated cells intermediate between pitted tracheæ and the porous cells of the ground tissue, and are not distinguishable from the same elements of the endocarp bundles. (See *Fig. 9, sp, g* and *f*.)

In breaking away the meat, the separation is through the middle of the veins and the inner layers of the outer testa, nearly all the ground tissue and about half of the vascular elements remaining on the inner surface of the shell.

(*b*) *Inner testa.* Firmly attached to the endosperm are from ten to twenty layers of small isodiametric or slightly elongated cells. The double walls are about ·003 m.m. thick and free from pores. These cells contain a material varying in color from light yellow to dark brown, which either fills them completely or occurs in globules, films, etc., as in some of the cells of the outer testa. In the layer adjoining the endosperm the cells are smaller and have darker brown contents than the cells in the other layers.

5. *Endosperm.*

Although the microscopic character of the endosperm has been fully explained by Harz, Hanausek and Moeller, a brief description is here given to accompany the descriptions of the other parts of the fruit.

In the outer layers the prismatic cells are nearly isodiametric (about ·05 m.m. in diameter), but further inward they are radially elongated, often reaching a length of ·3 m.m. Cell partitions are about ·003 m.m. thick, without pores.

The cells contain bundles of needle-shaped fat crystals and lumps of proteid matter, each lump containing, as a rule, a crystalloid. Ether and alcohol readily dissolve the fat crystals and strong potassium hydrate solution saponifies them. The proteid bodies give the usual color reactions with iodine, Millon's reagent and dyes.

III. THE DETECTION OF POWDERED COCOANUT SHELLS IN GROUND SPICES.

The adulteration of ground spices with powdered cocoanut shells was brought to notice in 1885 by W. H. Ellis,[1] public analyst, Toronto, Canada, and has since been frequently detected by A. McGill[2] of Ottawa and food analysts in different parts of the United States.

The extent to which this fraud is practiced is indicated by the following summary of results obtained by the writer during the years 1896–7 in the examination of samples collected in the State of Connecticut.

	Black pepper.	Cloves.	Allspice.
Samples examined	147	37	24
Samples adulterated (total)	47	17	11
Samples adulterated with ground cocoanut shells,	21	7	6

It is stated on credible authority that in Philadelphia at the present time about six hundred tons of shells, obtained as a by-product in the preparation of dessicated cocoanut—an article much used in pastries and confectionery—are annually reduced to a powder in mills of peculiar construction and sold to spice grinders. This powder, without further treatment, is mixed with ground allspice, which it closely resembles in appearance. By cautious roasting the color of ground cloves and nutmegs is matched, and by roasting at a higher temperature a charcoal is obtained which, mixed with starchy matter, is a clever imitation of black pepper.

Powdered cocoanut shells appears to be a distinctively American adulterant. The leading treatises on the microscopy of foods in the German, French and English languages, even those of recent publication, make no mention of it, and a number of prominent European food chemists and microscopists have declared to the writer that they had never heard of its use. On the other hand, cocoanut cake (the residue from the oil presses), which in Europe is commonly employed, both as a cattle food and as an adulterant of human foods, is almost unknown in America.

All the tissue elements of the mesocarp, the endocarp and the

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[1] *Dept. Inland Revenue, Rep. on Adult. of Food for 1885*, Ottawa, 1886, pp. 67, 79.

[2] *Laboratory of the Inland Rev. Dept.*, Bull. No. 20, 1890, pp. 7–11.

outer testa are present in cocoanut shell powder, but the stone cells of the endocarp make up the bulk of the material. (*Fig. 11, st*). These cells are characterized by their porous, brown-yellow cell walls, their dark brown contents which become a reddish brown on treatment with potassium hydrate solution, and the predominance of peculiar elongated forms. They differ in one or more of these characteristics from the stone cells of pepper, allspice, clove stems, walnut shells, almond shells, Brazil-nut shells, hazel-nut shells, peach stones and olive stones.

The outer testa, or lining of the shell, also forms a considerable part of the powder, the most striking elements being the thick-walled, porous cells (*p*) and the vascular elements.

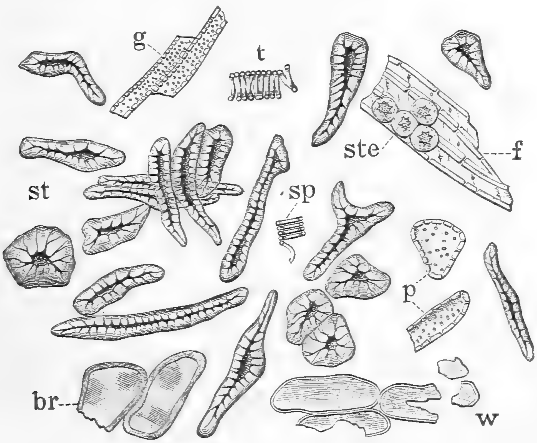

FIG. 11. Cocoanut shell powder. *st*, dark yellow stone cells with brown contents; *t*, reticulated trachea; *sp*, spiral trachea; *g*, pitted trachea; *w*, colorless and *br*, brown parenchyma of mesocarp; *f*, bast-fibers with stegmata (*ste*). × 160.

Colorless cells of the mesocarp ground tissue (*w*) are not distinguishable from the parenchyma of many other plants, but when impregnated with the brown substance which has been described they are striking objects (*br*). Potassium hydrate changes the color of these brown cells to a reddish brown, but ferric chloride does not produce any immediate effect, thus distinguishing them from cells of allspice seed, the color of which potassium hydrate removes and ferric chloride changes at once to a green.

Spiral, reticulated, and pitted tracheæ (*sp*, *t* and *g*), from the mesocarp, endocarp and testa bundles, are also frequently met with

in the powder, the pitted trachea being quite unlike any vascular elements of the spices.

The stegmata (*ste*) of the mesocarp fibers with their silicious contents are characteristic, but they are difficult to find owing to the great preponderance of other tissues. Bast-fibers (*f*) are more liable to be encountered than the stegmata, but they furnish less conclusive evidence.

Spices adulterated with charred cocoanut shells show under the microscope black, opaque fragments which are not bleached by aqua regia or nitric acid and potassium chlorate. Except in cases where some of the stone cells or other elements have escaped charring, this material cannot be distinguished from other forms of charcoal.

	Black Pepper. (Av. of 14 Analyses.)	Cloves. (Av. of 8 Analyses).	Allspice. (Av. of 3 Analyses)	Nutmeg. (Av. of 3 Analyses.)	Cocoanut Shells. (1 Analysis.)
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Water	11·96	7·81	9·78	3·63	*7·36*
Total ash	4·76	5·92	4·47	2·28	*0·54*
Ash soluble in water	2·54	3·58	2·47	0·86	*0·50*
Ash insoluble in hydrochloric acid	0·47	0·06	0·03	0·00	*0·00*
Volatile ether-extract	1·14	19·18	4·05	3·02	*0·00*
Non-volatile ether-extract	8·42	6·49	5·84	36·70	*0·25*
Alcohol extract	9·62	14·87	11·97	10·77	*1·12*
Reducing matters by direct inversion calc. as starch	38·63	8·99	18·03	25·56	*20·88*
Starch by diastase method	34·15	2·74	3·04	23·72	*0·73*
Crude fiber	13·06	8·10	22·39	2·51	*56·19*
Total nitrogen	2·26	0·99	0·92	1·08	*0·18*
Oxygen absorbed by aqueous extract	—	2·33	1·24	—	*0·23*
Quercitannic acid equivalent to O. absorbed	—	18·19	9·71	—	*1·82*

Chemical analysis is a valuable adjunct to the microscopic examination and often determines approximately the extent of the adulteration, but since other nut shells have a similar composition, the microscope is essential for the identification of the particular adulterant present. As was pointed out by the writer[1] five years

[1] *Conn. Agr. Expt. Sta.*, Rep. 1896, p. 34.

ago, the crude fiber obtained in the process of analysis is particularly suited for the microscopic detection of stone cells and other tissues.

The radical difference in composition between cocoanut shells and the spices to which they are added is shown by the results in the table on the preceding page by Winton, Ogden and Mitchell.[1]

In conclusion, the author takes this opportunity to thank his highly esteemed instructor, Prof. Dr. Josef Moeller of Graz University, Austria, for kindly assistance in the early part of this investigation. The work was begun in Professor Moeller's laboratory during the autumn of 1899, but after a year's interruption was finished at this station.

Acknowledgment is also due Prof. E. Gale of Mangonia, Florida, who generously furnished material for study, and also Herr F. X. Matalony, of Vienna, who skillfully reproduced on wood the author's drawings.

LABORATORY NOTES.

By Robert C. Pursel and Willard R. Graham.

Jaborandi Leaves.—The standard for the alkaloidal content of Jaborandi leaves has been set by the majority of manufacturers at 0·35 per cent. acid titration. During the past year nearly all of the samples submitted, answered the above requirement. Several samples, however, did not, as may be seen by the following data:

Six samples assayed between 0·17 and 0·28 per cent. of alkaloids, the average being 0·24 per cent.

All of the other samples contained a great many stems. The latter, when separated from the leaves of sample No. 5, were found to amount to 23·83 per cent.

Hydrastis Canadensis.—Several samples of golden seal were assayed, ether being employed in each case to dissolve the hydrastine, with the following results:

Five samples yielded between 2·76 and 4·16 per cent. of hydrastine by weight, the average being 3·47 per cent.

Carthagena Ipecac.—The following assays of Carthagena Ipecac tend to show that it is equal, if not superior, to the Rio variety in alkaloidal contents.

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[1] *Ibid.*, Rep. 1898, pp. 198–211.

Nineteen samples gave between 1·92 and 2·36 per cent. of total alkaloids in fresh drug, or calculated on moisture-free drug between 2·19 and 2·54 per cent.

Glycerin.—Several carloads of glycerin, obtained from one of the largest manufacturers in the country, have been examined recently. Aside from the trace of fatty acids it contained, it answered the U.S.P. requirements. It answered the U.S.P. tests for sugars, but when allowed to stand longer than six hours (from twelve to sixteen hours in the cold), it reduced Fehling's solution. For pharmaceutical purposes this probably would not be detrimental, but when used for preparing certain test-solutions that are in turn used for the detection of sugar in urine, the results might be very unsatisfactory for all parties concerned.

Soluble Blue.—Several samples of soluble blue were offered at a price much lower than we had been paying. Upon examination it was found to consist almost entirely of ultramarine blue, only a small per cent. being soluble. As there is a difference of about 25 cents per pound between the two (ultramarine being the cheaper) these parties, if they could have sold enough of their products, would, in a short time, have been millionaires.

Belladonna Leaves.—We have several times heretofore reported the alkaloidal content of belladonna leaves to be above the standard (*i. e.*, 0·35 per cent. total alkaloids by acid titration) adopted by manufacturers whose drugs are bought and sold upon the assay. Recently several samples were offered for sale and upon being assayed, they were found to be away below the standard. In appearance the leaves were very fine.

The analysis of nine samples gave between 0·10 and 0·22 per cent. of total alkaloids by acid titration, the average being 0·13 per cent.

Tannin Commercial.—A sample of tannin commercial was offered for sale at 35 cents per pound. As this was an exceedingly low price for this product, our suspicions were at once aroused and upon being assayed, it was found to contain 57·80 per cent. of tannin. In appearance it resembled finely powdered nut galls; this conclusion was confirmed by the per cent. of tannin it contained.

Yellow Wax.—Quite a few of the samples of yellow wax examined during the past year have been found to be adulterated in one way or another. The following table of constants shows the variations in the different samples:

No. of Sample	Specific Gravity at 15° C.	Melting Point.	Acid Value.	Saponification Value.	Ester Value.	Adulterant.
1	0·9437	62° C.	13·74	59·48	45·74	Paraffin.
2	0·9120	61° C.	10·77	56·78	46·01	"
3	0·9340	65° C.	6·36	30·72	24·36	"
4	0·9548	63·5° C.	19·16	99·92	80·76	
5	0·9560	63·5° C.	19·11	95·53	76·42	
6	0·9483	64° C.	27·14	102·36	75·22	Stearic acid paraffin.
7	0·9463	63° C.	24·31	95·00	70·69	" " "
8	0·9540	64° C.	19·50	93·33	73·80	
9	0·9520	52° C.	14·62	70·86	56·24	Paraffin, tallow, yellow ochre.
10	0·9515	63·5° C.	24·20	97·12	79·92	Stearic acid.

As may readily be seen by the above table, several samples are abnormal. When paraffin is used the acid value is naturally reduced; the latter is then brought up by the addition of stearin; usually in this case, too much is added, which makes the acid value abnormally high.

LABORATORY OF SMITH, KLINE & FRENCH CO.
PHILADELPHIA.

SOME NOTES ON OLIVE OIL.[1]

BY C. F. G. MEYER, JR.

The olive tree is believed by some to be indigenous to Asia and the seeds, being carried by migratory birds to the Mediterranean regions, grew into a wild tree called the oliaster, having a kind of thorn and short leaves and producing but a very small berry. This variety has been carefully cultivated and is now known as the sativa, which has a lanceolated leaf and bears a larger fruit.

The olive tree prospers best in a calcareous, gravelly and dry soil on precipitous slopes which could be used for no other fruit-bearing trees. It is a fruit tree of the highest order, but a great deal of care must be given it in order to obtain the best results.

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[1] [The above article by Mr. Meyer was prepared at the request of Joseph L. Lemberger, Ph.M., of Lebanon, Pa., who communicated the same to this Journal.—Editor.]

The average life of an olive tree is about one hundred years, but it may continue to bear fruit for a great many years after that age. It attains its full bearing capacity at about forty years, so that he who plants the tree does so more for posterity than for his own use, hence the old Tuscan proverb, *Vite di mio padre, olive di mio nonno*, which, freely translated, means, "The vineyard from my father; the olive yard from my grandfather."

When the tree has reached its maturity it is about 25 feet in height, has a very large trunk with widespreading branches, and small white flowers which grow in clusters, giving the tree a most beautiful appearance during the early spring months.

THE OLIVE AND ITS HARVEST.

The olives which are intended for preserving are picked early in September while they are still green, while those which are intended for oil are left until November, or even until the following year, by which time they have turned from a light green to an almost black color.

The oil pressed from the olives gathered in midwinter is preferred on account of its keeping properties; but the reason for an early harvest is that the insects have less chance to propagate in the fruit and that the new shoots which are to bear fruit the following year have not started and are thus safe from all injury.

The critical period of the olive is during the month of October when the fruit changes color, as in event of heavy rains or strong winds it is liable to be seriously damaged and it is therefore necessary to have experienced men constantly looking after the olive trees and to gather the nearly ripe fruit to prevent its being affected by these causes.

In former years the crops were gathered by women and children, who carelessly knocked down the fruit with long poles and in that way seriously damaged the berries so that they were unfit for making the finer grades of olive oil.

Nowadays, the olives are harvested by experienced men assisted by women and children. At first the ground around the tree is covered with large sheets of muslin to prevent the olive from being bruised when falling to the ground, as well as to protect them from the dirt which would greatly diminish the quality of the oil produced. The trees are then carefully shaken to bring down the ripe fruit.

After this shaking there are still some olives remaining on the tree. These are either hand-picked or are knocked down by gently tapping the branches with a long pole. When the fruit is all down it is gathered into large bags in which it is carried to the mill.

THE MILLS USED IN GRINDING THE FRUIT.

The mills in use today for the crushing of olives are very similar to those used for many centuries. One of the largest oil mills, situated in the suburbs of Nice, France, and which has been in possession of the family of the present owner for a great many years, is still being used with perfect satisfaction.

THE GRINDING OF THE OLIVES.

The olives are thrown into large stone crushers very similar to the chasers today used by the spice millers, with beveled edged millstones to fit the concave bottom of the container. The millstones are attached to a horizontal bar erected in the centre of the bowl, and it is by means of this bar that the stones are revolved. Some mills are operated by steam power, but more certain and satisfactory results are obtained by animal power, which is generally used, as the olives require slow and careful handling.

The millstones can be regulated so as not to crush the stone but simply to reduce the fruit to a paste-like substance.

After this has been accomplished the paste is transferred to flattish round bags loosely woven of grass and in which it is taken to the presses. These bags are so constructed that they will allow none of the pulp but only the oil to pass through them.

THE PRESSES AND HOW THEY ARE USED.

These bags are then placed on wooden platters of a trifle larger diameter, having handles on both sides, and are thus placed under the presses which are manipulated on very much the same order as our modern cider presses. The oil is forced out of the bags and caught up by drains which lead into large vats. Warm water is often poured through the presses so as to assist the flow of the oil, and when it reaches the vat the oil can easily be skimmed off of the water.

QUALITY IS THE MOST IMPORTANT FACTOR.

The finest quality of olive oil is that obtained from the first pressing and this is known as the (*olio di polpa*) pulp oil, or "Virgin oil," and contains nothing but the pure juice of the olive.

This oil is used for table purposes only, while that obtained from subsequent pressings of the residue, and which is a very inferior oil, is used in making soaps, liniments and lubricants.

The refuse which remains after the oil has all been extracted is used as a fuel or for manuring purposes.

THE ADULTERATION AND PRESERVATION OF OLIVE OIL.

Fraud is often practiced in the manufacture of olive oil, by taking olives which are not of a prime quality, or which have become mouldy, and adding leaves of the olive tree or seed oil to the pulp while it is being ground. These blend perfectly with the oil.

To keep olive oil in good condition the clear oil must be separated from the turbid at once, for the longer it remains in the lees the more apt it is to become rancid, as it absorbs oxygen rapidly and will soon reach a condition unfit for food. The original state can, however, be restored, as a general rule, by washing the oil with alcohol, or by using lime water in equal proportions. It congeals very easily when exposed to a low temperature, but by applying a little heat it will return to its original liquid state.

VARIETIES AND TESTS OF OLIVE OIL.

Olive oil varies greatly according to its physical characteristics, the finer quality, or "Virgin oil," having a pale yellow color with a slightly greenish tinge and only a very delicate odor, while inferior qualities have a more pronounced greenish color, a very unpleasant odor and a decidedly acrid taste.

The specific gravity of olive oil varies from 0·915 to 0·918 at 15° C. When heated to about 120° it becomes lighter in color; at 220° it is almost colorless, and at 315° it boils and produces a very disagreeable, rancid odor.

One of the principal adulterants is cottonseed oil, but rape oil is also used to a very large extent. Olive oil is slightly soluble in alcohol and dissolves very readily in ether, chloroform or carbon-disulphide.

One of the best tests for olive oil is the following, called—

BECHI'S TEST.

If 5 c.c. of the oil be thoroughly shaken in a test-tube with 5 c.c. of an alcoholic solution of silver nitrate (prepared by dissolving $\frac{1}{10}$

gramme of silver nitrate in 10 c.c. of deodorized alcohol and adding two drops of nitric acid to the mixture) and heated for about five minutes in a water-bath, the oil should retain its original color, not becoming reddish or brown, nor should any dark color be produced at the line of contact of the two liquids (absence of more than 5 per cent of cottonseed oil or any other foreign oils).

Another test for this oil is known as the "elaidin re-action," which is as follows:

If 10 c.c. of the oil be shaken frequently during two hours with a freshly prepared solution of 1 gramme of mercury in 3 c.c. of nitric acid a perfectly solid mass of a pale straw color will be obtained.

There are numerous other tests for olive oil but the above mentioned will give satisfactory results.

THE INFLUENCE OF CEREAL DECOCTIONS ON THE COAGULATION OF COWS' MILK.

By Charles H. La Wall.

For some years past it has been recognized by eminent authorities on dietetics that cereal decoctions, when added to cows' milk, play an important part in modifying the character of the curds which are formed when the casein is coagulated by the hydrochloric acid in the gastric juice.

The greatest difference between human milk and cows' milk has been shown to exist in the character of the curds which are formed by the addition of a coagulating agent; human milk forming fine flocculent coagula while cows' milk forms tough cheesy masses.

Many prominent pediatrists have long realized the value of cereal decoctions in the modification of cows' milk, and such men as Chapin, Heubner, Jacobi, Starr and Smith have openly advocated their use.

There has been some difference of opinion, however, as to whether conversion of the cereals has any modifying influence on the character of the curd, and this subject was taken up and thoroughly investigated by Dr. Franklin W. White about a year ago, with results which were summarized as follows:—

(1) Dilution of milk with cereal decoctions of proper strength renders the casein curd much more fine, soft and digestible than simple dilution with water. There is no difference in the action of various cereals, such as barley, oats, rice or wheat.

(2) The above property is due mainly, if not wholly, to the starch in solution, the most desirable amount of starch in the milk mixture for practical use is approximately three-fourths per cent.

(3) Diastase, by converting the starch to dextrine and maltose, promptly lessens and removes the action of cereal waters upon casein. Its addition, therefore, is not a practical measure when the action upon the curd is desired.

(4) Albumen water has no practical value as a diluent of milk.

(5) Lime water added to milk has no more effect than water upon the character of the curd produced in the animal stomach.—*Journal Boston Society of Medical Science*, December 4, 1900.

The following specimen tubes have been prepared in illustration of these facts:—

No. 1. Plain cows' milk, coagulated with HCl.

No. 2. Cows' milk and water (equal parts), coagulated with HCl.

No. 3. Cows' milk and cereal decoction, coagulated with HCl. Starch converted before coagulating.

No. 4. Cows' milk and cereal decoction (equal parts), coagulated with HCl. Starch converted after coagulating.

No. 5. Cows' milk and cereal decoction (equal parts), coagulated with HCl. Cereal decoction made from baked cereal flour.

No. 6. Cows' milk and cereal decoction (equal parts), coagulated with HCl. Cereal decoction made from arrowroot.

The curds in Nos. 1, 2 and 3 are seen to be in tough, cheesy masses, which would prove difficult of digestion even in the stomach of an adult.

The curds in Nos. 4, 5 and 6, on the contrary, are seen to occur in fine flocculent particles which would be easily attacked by the digestive enzymes.

The coagulation was accomplished by bringing the milk or milk mixture to a temperature of 100° F. and adding diluted HCl., several drops at a time, shaking after each addition, until the total acidity reaches 0·257 per cent, which is that of the normal human stomach.

The cereal decoctions were made by boiling the cereals for five minutes with water, regulating the amount so that the finished decoction contained 3 per cent. of starch.

NOTE ON SOUTHERN PRICKLY ASH BARK.

By W. L. Cliffe.

As is well known the Pharmacopœia recognizes two varieties of prickly ash bark; one being the product of Xanthoxylum Americanum, and the other Xanthoxylum Clava-Herculis, of which the

specimen I am enabled to present to the museum of this college through the courtesy of Mr. Robert Pursel, is a remarkably distinct example. In this part of the United States it has been the general custom to use the Northern, or X. Americanum, in the manufacture of pharmaceutical preparations; this selection being due, no doubt, to the fact that this variety is generally supplied by jobbers upon orders for "prickly ash bark."

There is a wide difference in the pharmacological value of the two barks; the southern or X. Clava-Hercules being far richer in the extractives which give the bark its medicinal value. As a practical illustration of this difference I have prepared two samples of the wine from typical specimens of each variety, and the color, pungency and bitterness are easily differentiated upon comparison. This difference is also readily noted upon chewing a portion of each variety. Another point noted in the manufacture of the wine, which is a 50 per cent. preparation, is that in the case of the northern variety a fairly good exhaustion of the drug is secured by good sherry, but in the case of the southern variety simply saturation occurs without thorough exhaustion, and the marc retains distinct identity.

Prickly ash has been prescribed frequently in Philadelphia as a uterine tonic and stimulant and also used externally as a counter-irritant and for all its therapeutic uses the southern prickly ash would seem to be more satisfactory than its northern relative.

PHILADELPHIA, October 15, 1901.

RECENT LITERATURE RELATING TO PHARMACY.

VALUATION OF NEW REMEDIES.

Professor Kobert, of Rostock, read a striking paper on the above subject at the German Naturalists' Convention (*Aerzt. Vereinsblatt für Deutsch.*, 1900, 435). He calls attention to the ever-increasing number of new remedies, their personal literature teeming with highly embellished testimonials, and withal how very little the practicing physician knows of their real value. He then asks if authoritative judgment of these remedies based on clinic, chemical and pharmacological examinations is possible, and how such judgment is best obtained.

The unsupported word of the medical press can be scarcely taken as their opinions are too strongly influenced by their advertising pages and reports of individual workers are of little value, as the finding of such data means search through a hundred journals.

What the practitioner needs is an authoritative publication relating to this subject and to this subject only, and entirely uninfluenced by advertisements.

How can this be accomplished?

The writer hopes to see the day when the paternal German government will establish an institute of medical testing, similar to the present Imperial Serum-Testing Institute, and like the pure food laboratories scattered throughout his country; that at this institute all new remedies be tested chemically, clinically and pharmacologically, and that only those medicaments receiving the approval of the institute be permitted sale in the empire.

That failing (or postponed) he suggests that the reform be inaugurated by the Naturalists' Society; that this association seek the aid of its members and others—pharmacologists, surgeons, gynecologists and other medical specialists, chemists, bacteriologists, etc., begging reports on each new medicine they have used. A committee is then to compile the data received and publish same for the benefit of the medical profession. It is assumed that physicians will then prescribe only those medicines recommended by the association—a rather doubtful assumption. H. V. ARNY.

OVULA GLYCERINI.

For gynecological purposes, round suppositories containing about 16 grammes glycerin and appropriate medicaments are popular in France. The base of these are made, according to J. Hofmann, as follows: Fifty grammes gelatin is mixed with 100 grammes water and 250 grammes glycerin, warmed on water bath till dissolved and the water has evaporated, an addition 150 grammes glycerin added, as well as the medicating agent, and the melted mass poured into moulds and allowed to solidify.—*Ph. Weekbl.* through *Schw. Woch. f. Ch. u. Ph.*, 1901, 143. H. V. A.

CRYOSCOPY.

An interesting *résumé* of this study, which is destined to have pharmaceutical importance, is found in a paper by Ardin Delteil (*Schw. Woch. Ch. u. Ph.*, 1901, 195) in which the significance of

comparison of the freezing point of a solution with that of its solvent alone, is traced in historical order.

Raoult's law (depression of freezing point is directly proportioned to amount of solids dissolved); the discovery that equi-molecular solutions have the same depression of freezing point; the value of this fact in estimating molecular weights are all noted in the paper, but omitted here, as details can be found in any text-book on physical chemistry. In the paper particular stress is laid on the fact that depression of freezing point of a solution is in direct proportion to the osmotic pressure of same, hence by reading freezing point depression of a liquid, we learn its osmotic pressure. This measurement of osmotic pressure is of great value in physiological chemistry, and the estimation of depression of freezing point introduced by Dreser in 1891 has now become an essential part of the clinical examination of the liquids of the organism, such as blood, serum, urine, lymph, milk saliva, sweat, etc. It is interesting to note that all the physiological liquids save urine, have about the same freezing point depression (hence same osmotic pressure) as blood serum; that is, in the normal state of the organism, all its natural liquids are in physical equilibrium.

Cryoscopy is of interest to pharmacists inasmuch as the measurement of freezing point is becoming a necessary part of urine examination.

H. V. A.

SPURIOUS SANDARAC.

R. Haneke (*Pharm. J.*, 1900, p. 79), reports on a fictitious sandarac of Spanish origin. Physically it was an exceedingly fine specimen, consisting of elongated and rounded tears, pale lemon-yellow in color. On chewing, it adhered to the teeth, and melted at the temperature of the water bath, while sandarac is not materially changed at 130° C. (Some varieties of colophony possess as high a melting point as 135° C., L. F. K.). Sandarac has an acid number varying from 136–140. (The acid number of colophony varies from 130 to 181, L. F. K.). The above sample's acid number was 169. From the above date and etc., behavior towards solvents there is little doubt but that the specimen consisted of colophony.

L. F. Kebler.

FOOD VALUE OF EXTRACT OF MEAT.

L. Fürst, (*Chem. Ztg.*, 24, 994,) reviews the statement made by a number of authorities relative to the true nutritive constituents

of meat extracts and comes to the already generally accepted conclusion that the albumoses, peptones and albumins are present in too small quantities to serve of any value as foods. The small quantity usually taken can have nothing more than a stimulating effect. L. F. K.

PHENYLETHYL ALCOHOL IN ROSE OIL.

It has been the common experience of all investigators of steam distilled rose oil to find that it contained only a small percentage of phenylethyl alcohol as compared with the large percentage contained in extracted oils. (The steam oil is made from the fresh leaves, the extracted oil usually from dried leaves, L. F. K.) Walbaium came to the conclusion that this alcohol was not developed until the rose petals were dry. H. von Soden and W. Rojahn, *Ber.* *33*, 3063, show that *the phenylethyl alcohol is quite soluble in the aqueous distillate and in this way is generally lost.* It can be extracted from the distilled water by shaking out with ether. These workers examined *rose pomade* made by the method of Hesse and Müller, *Ber.* 1899, *32*, 565 ; abstr. in Jour. Soc. Chem. Ind., *18*, 1899, 396) viz., macerating fresh rose leaves with warm fat, this pomade contained 0·56 per cent. of volatile oil ; 46·5 per cent. of which was phenylethyl alcohol. "*Rose Pure*" a brownish yellow viscous oil, obtained by extracting the petals with a volatile solvent, was distilled with steam and the volatile oil thus obtained was found to contain 25 per cent. of phenylethyl alcohol. This investigation clearly shows that phenylethyl alcohol is a normal constituent of fresh rose leaves, being formerly lost in the aqueous distillate. See also this Journal, 1901, page 199. L. F. K.

OXIDATION OF ALOIN, BY MEANS OF POTASSIUM PERSULPHATE AND CARO'S ACID.

E. Seel (*Ber.* *33*, 3212) found that the action of potassium persulphate on aloin from Barbadoes aloes produced different oxidation products, according to the quantity of reagent. An excess yields a pale-red compound, apparently an unstable oxygen addition product, in almost quantitative proportions. The same product is obtained by electrolytically oxidizing aloin in dilute sulphuric acid or by means of potassium percarbonate. Caro's reagent, sulphuric acid and potassium persulphate (*Ztsch. augew. Chem.*, 1898, 845);

or Baeyer's mixture of hydrogen peroxide and sulphuric acid (*Ber.*, *33*, 124), produce a brownish-red powder from which chloroform extracts tetrahydroxy-methyl-anthraquinone, $C_{15}H_{10}O_6$. L. F. K.

CITRAL, DETERMINATION IN OIL OF LEMON.

E. J. Parry, (*Ch. and Dr.* 57, 1900) replies to criticism contained in *Schimmel's Semi. Ann. Rept.*, October 1900, 25, on his method for estimating citral in lemon oil (*Chem. and Drug.*, *56*, 376). The first objection raised is that as high as 1 per cent. of citral passes over in distillations at very low pressures, this loss being made up or exceeded by the limonene absorbed by the cyanacetic acid solution. The second objection raised is that an exact reading of the volume in the graduated portion of a Herschsohn's flask is impossible. In reply to the first criticism the writer says that he has distilled many samples of lemon oil at a pressure of 10 millimetres and possibly below, but has never yet found any portion of the limonene to contain more than the merest trace of citral. The second objection is met by stating that the reading is not much more difficult than it is in several other absorption processes. He reiterates that his method gives more accurate results than any other thus far proposed. L. F. K.

MAIZE IN WHEATEN FLOWER, DETECTION OF.

E. J. Bevan tested (*Analyst*, *25*, 316). A. C. Wilson's method and found it to give satisfactory results. The process is executed as follows: mix the flour with clove oil and examine under the microscope with a one-fourth or one-eighth objective. The hilum of maize starch is indicated by a black dot or star while wheat and other starches are practically invisible.

G. Embrey (*Analyst*, *25*, 315) was unable to obtain satisfactory results with Baumann's quantitative method (*Ztsch. f. Untersuch. Nahr. u. Gemussmittel* 1899, *2*, *27*). He therefore offers the following modification: place 0·2 grammes of the sample into a 15 cm. by 2 cm. test tube, provided with a paraffined cork. Add 20 cc. of aqueous potassium hydroxide (18 Gm. per litre), shake well for three minutes, add twelve drops of 10 per cent hydrochloric acid, then introduce the tubes into a centrifugal and at whirl 600 revolutions per minute. Transfer 1 cc. of the clear liquid into a Neesler tube, dilute to 50 cc.; add 1 cc. of iodine solution (I, 0·25 Gm. KI, 1

Gm. and water to 250 cc.) and shake well, on comparing the tint obtained with the standard tints (made from known material) the percentage of adulteration can be ascertained within 5 per cent. A method for making more exact determinations is also given.

L. F. K.

QUANTITATIVE ESTIMATION OF FORMALDEHYDE.

After experimentation with all suggested methods of formaldehyde assay, Utz (*Süddtsch. Ap. Zt.*, 1901, 147) reports the following as satisfactory: *Henberg's* method, in which the sample is treated with an aqueous solution of diphenylen-dihydrazin hydrochlorate, and from the weight of the washed and dried crystals of composition,

$$\begin{array}{l} C_6H_4HN - N = CH_2 \\ \| \\ C_6H_4HN - N = CH \end{array}$$

the quantity of formalin is deduced. This method gives best results in a 1 to 1,000 solution.

Clowe's process, in which the formaldehyde is condensed with phloroglucin, 4·6 parts of the dried solid representing 1 part of the aldehyde.

Both these gravimetric processes prove tedious, hence a volumetric process is preferable, and of these the writer prefers the *Romijn* and the *ammonia* processes. In Romijn's the liquid is treated with the decinormal iodine and then with strong soda solution to a bright yellow tint. After ten minutes hydrochloric acid is added until the liquid is brown and the free iodine is titrated with decinormal thiosulphate. Two atoms iodine equals 1 molecule formaldehyde.

The ammonia process, discussed by Kebler (see this JOURNAL, 1898, 432), has been adopted by the German pharmacopœia. Utz denies the inaccuracy of the process complained of by Kebler, claiming good results by allowing the mixture of ammonia and formalin to stand an hour.

H. V. A.

LOCATION OF ALKALOID IN VERATRUM ALBUM.

By microchemical alkaloidal reagents, viz., phosphotungstic acid or ammonium molybdate, the active ingredients of Veratrum album were sought for in the tissues of the plant, and were found practi-

cally only in the starch-bearing parenchyma cells of the rhizome and the rootlets. The alkaloids are found most abundantly in the older parts of the rhizome, attaining the minimum at the root cap. The stem contains some alkaloid, also in the starch-bearing parenchyma, but the bulb scales and the leaves contain only traces. This is out of harmony with the previous investigations of Borcon, who claimed that the alkaloid was chiefly found in the cell walls of the epidermis—an error in judgment, due to the use of concentrated sulphuric acid as the reagent.—(Dr. Rinquist, *Ph. Post*, 1901, 117.)

H. V. A.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Practical Text-Book of Plant Physiology. By Daniel Trembly Macdougal. With 149 illustrations. London and Bombay: Longmans, Green & Co.

This work is intended to bring together the facts and theories regarding plant physiology so that the student may profitably pursue such investigation. The author has not only drawn from his own resources but has obtained the fortunate coöperation of a number of well-known American botanists in the preparation of certain parts of the book. The following is a synopsis of the contents of the work: (1) Nature and relations of an organism; (2) relation of plants to mechanical forces; (3) influence of chemicals upon plants; (4) relation of plants to water; (5) relation of plants to gravitation; (6) relation of plants to temperature; (7) relation of plants to electricity and other forms of energy; (8) relation of plants to light; (9) composition of the body; (10) exchanges and movements of fluids, (11) nutritive metabolism; (12) respiration, fermentation, and digestion; (13) growth; (14) reproduction; (15) an appendix of tables; (16) an index.

It is extremely fortunate that the author has collaborated the results of the various investigators in physiological botany and brought them together in such a small volume. One of the most wholesome lessons to be learned from a careful perusal of the book is the extensive theorizing that is done in this branch of botany on more or less isolated experiments and the careful work that is necessary in order to develop the science of plant physiology. For instance, in the portion on "the influence of chemicals on the toxicity

of certain substances;" their retardation of plant growth is considered but no mention is made of the fact that these so-called toxic substances may not only possess an inhibitory effect on plant growth in one degree of concentration, but according to the varying strength of the solution they may simply retard development temporarily, or may stimulate activity or produce no effect whatsoever.

The Absolute Atomic Weights of the Chemical Elements, established upon the analyses of the chemists of the nineteenth century and demonstrating the unity of matter; presented in simple language to the general scientific public. By Gustavus Detlef Hinrichs. St. Louis, Mo.: C. G. Hinrichs.

This work is divided into four parts, in which are considered: (1) The errors of precision in atomic weight determinations; (2) the absolute atomic weight of ten leading elements; (3) the absolute atomic weights of boron and nitrogen; (4) tabular view of the atomic weight analyses of the nineteenth century.

The author shows the liability to error in taking the mean of a series of determinations as the basis of arriving at the true atomic weight of the elements. In the note on the atomic weight of arsenic (see this Journal, p. 497) the author has shown the precision of his method.

The diamond has been taken as the standard of matter for all atomic weight determinations, and the methods of direct oxidation and reduction of the metals as employed by Berzelius and his pupils are considered among the best methods for atomic weight determinations. The labors of the author are deserving of careful consideration. It is unfortunate, however, that he has not been content simply to discuss the labors of Stas, Clarke and others. While the language used in regard to various chemists may not vitiate the facts, it will, however, tend to prevent their dissemination as easily as otherwise might have been the case.

Die Serum-, Bakterientoxin- und Organ- Präparate. Ihre Darstellung, Wirkungsweise und Anwendung. Für Chemiker, Apotheker, Aerzte, Bakteriologen, etc., dargestellt von Dr. Max v. Waldheim. Wien, Pest, Leipzig: A. Hartleben's Verlag.

The remarkable discoveries in the past ten years in bacteriological, physiological and chemical researches under the leadership of Pasteur, Koch, Behring and others, has given us in blood serums, bacteria

toxins and organo-therapeutic preparations a remarkable class of remedial agents in disease. Most of these results have been published in the various journals or in special monographs. It is extremely satisfactory to have a work such as the present one of Dr. Waldheim containing all these different results so that one can familiarize oneself with these new preparations. The following subjects are treated in this book: In Part I: Alkoholismus; Blattern (variola vera); Cholera; Diphtherie; Dysenterie; Gelbfieber; Gonococceninfection; Kolibaccillose; Krebs (carcinoma) und Sarcom; Künstliche Sera, Medicamentöse Sera; Lepra; Lyssa, Tollwuth (rabies); Pest; Pneumonie; Pyocyaneusinfection; Reconvalescentenblutserum; Rhinosklerom; Schangenbissvergiftung; Staphyloccen-infection; Streptococceninfection; Syphilis; Tetanus; Tuberculose; Typhus. In Part II the following subjects relating to organo-therapeutics are considered: Blutbildungsorgane, embryonale; Blutegel; Bronchialdrüsen; Eierstock; Gehirn; Gehirnanhang; Hoden (Brown-Sequardine); Hornsubstanz; Knochenmark; Leber; Lunge; Milchdrüsen; Milz; Muskeln; Mutterkuchen; Nebennieren (glandulæ suprarenales). Nebenschilddrüsen; Nieren; Nukleinstoffe; Ohrspeicheldrüse; Pankreas; Schilddrüse; Schleimhäute.

An index arranged according to subjects and another according to authors completes this valuable little work. The cost of the book bound is 6 m., 80 ff.; in a paper cover, 6 m.

Die Technik der Kosmetik. Handbuk der Fabrikation, Verwerthung und Prüfung aller kosmetischen Stoffe und der kosmetischen Specialitäten. Von Dr. Theodor Koller. Wien, Pest, Leipzig: A. Hartleben's Verlag.

Inasmuch as the preparation of the various cosmetics is dependent upon the application of the principles of chemistry and bacteriology it is possible that this art may be developed as a branch of one of the applied sciences. The field is peculiarly fertile and attractive and those who are in any way interested in the subject will find the work of Koller of great value. The following is a list of contents: Die Aufgaben der Kosmetik; Materialienkunde (under which are given the various methods of preparations of odorous principles and the chemical, animal and plant substances employed); Allgemeine kosmetische Mittel (includes various preparations for the care of the teeth and hair); kosmetische specialitäten; Antiseptische

Wässer und Seifen; kosmetische Toiletteseifen und hygienische Seifen; kosmetische Geheimmittel; Prüfung und Untersuchung von in der kosmetischen Technik verwendten Stoffen.

The work contains numerous formulæ as well as the general consideration of the general principles involved in their preparation and application.

PHARMACEUTICAL MEETING.

The first of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1900–1901, was held on Tuesday, October 15. Prof. C. B. Lowe presided, and in opening the meeting stated that it was the desire of the committee having these meetings in charge to make the present series even more useful than their predecessors, presenting matters in particular relating to practical pharmacy, and urged all those present to co-operate in this work. The programme was an interesting one and the first speaker introduced was Dr. Jokichi Takamine, of New York City, who read a paper on "Adrenalin the Active Principle of the Suprarenal Glands and its Mode of Preparation." (See page 523.) The author stated that he had succeeded in isolating adrenalin in a pure, stable and crystalline form, which latter character he illustrated by means of diagrams. Several of the characteristic tests for the substance were carried out and also a diagram was exhibited showing the effect of the substance on the blood-pressure.

In the discussion on this subject Dr. Lowe spoke of the influence of the suprarenal glands on the vasomotor system and their usefulness in keeping up its tone. He said that until recently it had not been well understood just how this influence was exerted, but that now it was ascribed to adrenalin. He attributed its usefulness in inflammation to its power of reducing the calibre of the vessels and hence the amount of blood. In reply to a question by W. L. Cliffe as to the keeping qualities of the solution in which form adrenalin is generally sold, Dr. Takamine said that it might be compared to cocaine in this respect, and that certain chemicals, such as boric acid, are used to preserve the solutions. Sodium chloride is also added to the solution so as to render it non-irritating in eye and nose affections, this addition not being objectionable, particularly in disease of the heart. With regard to the activity of adrenalin the speaker stated that it was not poisonous and appeared to be

perfectly inert when administered to persons in normal condition, but when used with persons having a weak heart its effect was soon noticed.

M. I. Wilbert, of the German Hospital, Philadelphia, read a paper on "Digestive Ferments in Surgical Practice," and presented in connection therewith a sample of a physiological solvent which is in use at the Hospital and which he has designated as "Physol." (See page 535.)

W. L Cliffe presented a "Note on Southern Prickly Ash Bark," and on behalf of Mr. Robert Pursell donated a fine specimen of the drug to the college. (See page 562.)

Charles H. LaWall read a paper on "Coagulation of Cows' Milk by Cereal Decoctions," which subject he illustrated by means of a number of specimens. (See page 561.)

The next feature of the programme was an exhibition of specimens of the adulterations of drugs, submitted by the Smith, Kline & French Co. These specimens constituted the exhibit made by this company at the St. Louis meeting of the American Pharmaceutical Association, and were described by Lyman F. Kebler.

In connection with this subject Evan T. Ellis read a letter from a London firm to whom he had sent a quantity of peppermint oil, which he had purchased from an American house, stating that the oil contained 12·15 per cent. of resin and was of a reddish color. In remarking on this subject Mr. Kebler said that old oils were likely to contain resin, but that the amount reported was large. In regard to the color he said that it is quite common to find essential oils colored. This is due to the fact that if water be present in the oils, it separates out in cold weather and rusts the containers, thereby causing coloration of the oils.

Mr. LaWall exhibited a subliming vessel containing iodine, part of which was sublimed and the remainder in the crude condition, the sublimation having been carried on by means of the waste heat from a boiler.

Before adjournment the chairman announced that Mr. Henry P. Hynson, of Baltimore, would be present at the next meeting and present a paper on "Modern Drug Store Methods," and also that Mr. Wilbert would present a communication on a "Metric Medicine Glass."

FLORENCE YAPLE,
Secretary, pro tem.

PHILADELPHIA COLLEGE OF PHARMACY.

The semi-annual meeting of the members of the Philadelphia College of Pharmacy was held September 30, 1901, the President, Howard B. French, in the chair; thirty-five members were present. The minutes of the quarterly meeting held June 24th were read and approved. The minutes of the meeting of the Board of Trustees for June were read by the Registrar, W. Nelson Stem, and approved as read.

Mr. Stiles, for the delegates to the Pennsylvania Pharmaceutical Association meeting held at Harvey's Lake, June 18–21, reported verbally, as a very full report of that meeting had been published in the AMERICAN JOURNAL OF PHARMACY for September, page 446. Further report was unnecessary. In addition to what had already been published Professor Remington alluded to the good work that had been done by Joint Committees of the Pennsylvania Medical Association and Pennsylvania Pharmaceutical Association on free dispensaries and that the Medical Association at the meeting recently held in Philadelphia had unanimously adopted the plan proposed by the Joint Committee (see AMERICAN JOURNAL OF PHARMACY, page 467). Credit was due our fellow member, J. C. Perry, who was the author of the plan.

The report of the delegates to the American Pharmaceutical Association held at St. Louis, September 15–20, was read by Professor Kraemer, as an extended report of the proceedings was published in the AMERICAN JOURNAL OF PHARMACY for October, page 482–510, he called especial attention to the fact that as the next meeting will be held in Philadelphia in 1902 it would seem desirable to appoint a committee to consider in what way, or ways, the College might contribute to the success and interest of the meeting.

The suggestion was discussed by Messrs. Meyer, Lowe, Cliffe, Perry, Kraemer and Remington, when Professor Remington offered the following resolution: "That a committee of five be appointed by the chair to take into consideration all matters pertaining to the meeting of the American Pharmaceutical Association in 1902 in which the College may be interested," which was adopted, and the chairman be requested to appoint the committee at his leisure.

Mr. England, for the Committee on Nominations, reported that, in accordance with Article VIII, Section 19, the following named gentlemen were proposed for the three vacancies in the Board of Trustees, which would occur at this meeting of the College—E. M. Boring, R. M. Shoemaker, Lawson C. Funk, Charles Leedom and Walter A. Rumsey.

Election for three trustees being next in order, letters were read from Messrs. Funk and Rumsey declining the nomination. There being no further nominations, on motion of Mr. Gordon the Secretary was directed to cast an affirmative ballot for Messrs. E. M. Boring, Richard M. Shoemaker and Charles Leedom, for the term of three years. Melville W. Bamford and Lucien Scott Kemp were unanimously elected to membership in the College.

The President expressed his pleasure at the larger number of members present at the meeting.

C. A. WEIDEMANN, M.D., *Secretary*.

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MODERN EVIDENCES OF PHARMACEUTICAL PROGRESS AND THEIR VALUE.

By Henry P. Hynson.

"Modern Drug Store Methods" was the title suggested for this paper by the gentleman who kindly invited me to read it before you. The suggestion conveyed to me not only his wishes regarding the kind of matter I should present, but it told me just why I happened to be so greatly honored; yet, this very knowledge brings me considerable embarrassment. It is because I have given so freely of my little store during three consecutive years that I was asked, and it is because I have given so freely during the same years that the "well has gone dry."

If, therefore, I borrow much from the proceedings of the American Pharmaceutical Association—a rich store-house, by the way—I trust I will be pardoned. It is better to present the old that is good than the bad that is new.

Modern and improved pharmaceutical methods have developed so gradually, and have been added to the whole in such regular order, that their practical utility and helpfulness is often overlooked. We must needs occasionally bring ourselves to a fair and sudden realization of exactly what they are before we can place upon them their individual or collective values. The question which, answered, brings most satisfaction and comfort is not "What am I?" but "What have I become?" The one is answered by a comparison with something I may be, the other by a comparison with what I was. In the latter test the past is vividly brought before us, as in

panoramic view, recording history from which our conclusions must be deduced.

Pictures and history, then, will offer us the standards by which we are to value our attainments, notwithstanding the statement of so great a writer and so great a critic as Lord Macaulay, who says, "No picture and no history can present us with the whole truth" —and, since it takes the master-hand to present enough of the truth to make a comprehensive whole, the underling must content himself with presenting the very commonplace in minute detail.

I will illustrate my apology by sketching in outline—very dark outline—the "drug-store towel." It needs but a few strokes to show it to you—possibly hanging, oftener lying around in almost any position upon the prescription counter. It looks lonely, because there are so few, or none, perhaps, to take its place. Its history, so freely written, adds nothing to its credit. The few strokes I have made are sufficient for the *towel;* but a better subject needs better work, and I present a properly dressed dispenser, with two towels attached to his clothing—one large and absorbent, the other small and fine, for finishing. These are his, have his mark on them. He owns several other sets, which he may have laundered as often as he pleases. You will notice that this picture is much more attractive because of the presence of a twenty-five-yard roll of absorbent surgical gauze in a near-by drawer, in which will also be seen a long pair of teller's or coupon shears. These shears and this gauze will enable the dispenser to make many hundreds of the cleanest, most satisfactory little towels imaginable; perfectly dry and very handy for fine work, at a cost of seventy-five cents for all.

This gauze also answers admirably for wiping off capsules, for drying soluble elastic capsules, after washing in alcohol—so often necessary. These small pieces should be retained in a convenient box or drawer, to be used most advantageously for protecting the larger towel. Whatever is of such a nature as would greatly soil the towel can be disposed of by using a piece of this once-used gauze and throwing it away. It is much better than paper, or even sawdust, for such purposes.

Two or more thicknesses of absorbent gauze answers admirably for coarse, rapid straining. This must bring to mind vivid pictures of the old-time strainer, and offers another sample of my would-be art. It may be more than of the cheaper muslin sort or yet a cork

bag. Even of expensive flannel, it looks just about the same. This picture needs much color, because the old strainer was always stained after its first use and, if you could paint odors, might mix your colors with cod-liver oil, because that gave the odor which always hung around the strainer of our fathers, no matter how hard we *tried* to keep them clean. It is by such a picture that I would make clear the value of absorbent cotton to the dispenser—snowy white, always clean, sterile, rapid, effective. This, with a number of properly assorted small glass funnels having long stems makes a fair picture of the dispensing of solutions. Gauze and cotton enable us to do as we would be done by when cleanliness is the consideration.

Need I mention that if, when filtering or straining, the operator will use a funnel with a sufficiently long stem and be sure that the outside of the funnel and the neck of the bottle are perfectly dry, the escape of air will be insured? Need I picture the reverse of this little gain? On and on one may go showing how careful observation and generous brotherhood have added improved methods and devices of great value: striking evidences of progress. Not only is this true of one department and regarding very simple things, but it is equally true of all departments; about more exalted doings. Changes have affected every phase of our calling and its practice, and the sooner we recognize these and the advantages accruing therefrom, the better will be our chances of success. If one is skeptical, he may reason the matter out on logical bases. If he doubts the advisability of locating upon a thoroughfare and near the centre of trade rather than, as was formerly desirable, in a more remote, residential district, does he not see that influences wonderful and mighty have been at work to bring this about? The world has grown strangely small, and each one of its subdivisions has grown smaller in the same degree. Does he wonder why physicians congregate in the most advantageous centre, without regard to local practice, as formerly? The telephone has brought it about in two ways, which are quite obvious; this same influence is soon to be felt in helping to concentrate the pharmaceutical business. The passing of the strictly local drug store, as a drug store, and the increasing trade in side-lines is largely due to the fact that the emergency pharmacy is no longer necessary; it is replaced by the physician's pocket, largely his hypodermic syringe case, which is often supple-

mented by the knowledge and forethought of the trained nurse. But what advantage or blessing, it may be asked, does this enlargement of the large and curtailment of the small bring? The answer is quickly made—"much and many."

I would in no way disparage the smaller stores. I would in kindness sound a warning note and lend a helping hand. It is only in the enlargement of stores and by the concentration of effort that I see release from long hours and overwork. Higher practice must be had in better stores not in more stores. If this is not true, it is possible, and will, I believe, certainly follow. There are many evidences that this is the case already. Where do we find the most desirable and competent assistants? Are they not constantly seeking and finding positions in the larger establishments? And is it not because they are better paid and have more privileges? It is there that their talents and acquirements find a better market, because needed.

Helpful progress has been made in fixtures, in the arrangement of stock, in the selection and purchase of the latter; progress in bookkeeping, in the training, selection and proper placing of assistants and general help has been made.

Containers and wrappings have been improved, and especially have methods of identification, standardization, manufacture and dispensing advanced. Some of these, if you will allow me, I will tersely illustrate.

Regarding Fixtures: In the modern drug store the old counter, with its dark cupboard-like interior has or should have disappeared; in its place counter show-cases should be found. They enable customers to see what you have and you to find what is wanted. These should, however, have sliding doors in front as well as back. The front doors add immensely to the value and convenience of these cases and need not greatly detract from their appearance. The old tiers of drawers, dusty and often infested, each drawer bearing the label of one article it did not hold but containing a dozen or twenty-nine others of varying potency and odors; instead you will find a sufficient number of inexpensive but neat tin cans to separately contain such stock as was formerly kept in drawers. Let me ask in this connection, why could not formaldehyde be judiciously used to prevent the development of vermin in such drugs as tend to deteriorate in this manner? We are trying it with

orris root. I suggest experimentation along this line. Again, you will notice that cupboards formerly used as a base for cases and shelving have disappeared; all shelving for holding cans, jars, bottles, etc., and all wall-cases begin upon a closed base, not more than 10 inches from the floor and are continuous to any height desired. Yet I am sure that a "reachable" height and a gallery is by far the most desirable. These cases will show what they contain. The greater depth of wall-cases is a modern thought, one that must be utilized to be fully appreciated. In the modern pharmacy the glass-labeled shelf-bottle has been greatly lessened in numbers or has been entirely relegated to the prescription or dispensing department, and naturally so. They are not for sale; they require extravagant attention to be kept presentable. One wonders why they have been shown so long; to have customers note how little many of these are used and how "stale" their contents must be. We become so used to our stores and stock that we fail to see the true picture they make. Look about you, on a return, as if you were a customer; notice, especially, your shelf-bottles. A good modern rule for these is to have only so many as will add to your convenience and none for show. The use of original containers kept in colored glass cases seems to offer many advantages; protection from light; saving of time required for cleaning and drying old container and in transferring; the non-mixing of the old with the new; especially is this important with essential oils, fluid extracts, etc. Besides, the original container, having generally a decided individuality, offers protection.

It may be well, in passing, to note that the glass doors of wall-cases may be effectively and attractively obscured by painting the inside of glass with liquid asphaltum, easily secured at paint stores. In connection with fixtures in detail, I am led to call attention again to a container for distilled water or whatever kind is used in dispensing. A two-gallon irrigating bottle is arranged upon a shelf high enough to place it above the line of vision of the tallest assistant; to it is attached a short piece of pure gum tubing, to which is adjusted a pinch-cock; the neck of the bottle is filled with absorbent cotton. Nothing could be more effective than this, considering both facility and accuracy.

One must not attempt to adopt modern methods unless they can be advantageously and consistently carried out. The entire separa-

tion of the prescription or dispensing department from the room in which customers are received and served, and connected with it by a waiter, has many and decided advantages, if sufficient force is available to insure the presence of four persons during business hours. With less than this, it had better not be undertaken. One person cannot possibly attend to trade and waiter; neither can one person attend to waiter and compound prescriptions. Experience leads me to offer the suggestion that the plan had better not be undertaken with less than eight available men. With such a number it works beautifully, economizing labor and time, while developing specialists in the very different fields of salesmanship and dispensing. This separation of the two departments allows me to hold before you a picture of presentable salesmen: in clothing not soiled or scant; hands and nails that are absolutely impossible with a dispenser; able to properly receive and serve patrons, with no distracting thought of what the prescription may contain or the manner in which it has been compounded. He is free to meet the oft-trying demands of the customer in the best possible manner. I am also able to show you a dispenser comfortably and appropriately clothed, quietly placed, with no distracting influences; not hurried by the impatient customer, and in a roomy, well-lighted apartment, with ample utensils and facilities. In the sales-department is stocked everything that can be passed to the patron without change; in the laboratory will be found all products used in compounding or required to be arranged for the special requisition. Orders are classed as "waits," "calls," and "send-outs." The latter are subdivided into "hurry," "time," and "unmarked," which means any time during the day. Each class is numbered, and impartial, systematic order is the rule. In the sales-department no more is done with the prescription than to properly receive, wrap and deliver it. Yet this requires care and systematic treatment. Order blanks are used for everything to come from the laboratory; for all "send-outs;" also, for all charge-sales not "send-outs." If a customer is passed articles to be found in the sales-department, no order blank, of course, is used. Checks are given for all "waits" and "calls;" "send-outs" are entered in a delivery book, where proper notation is made as to the time for delivery. Checks are numbered with a triplicating numbering machine, which puts a corresponding number upon the prescription and order blank. Checks for renewals are numbered

with a pencil. These companion sketches of the separated departments of the modern pharmacy are among our most pleasing productions, with but a single blemish. If worked out in a little more detail they show most satisfactory results from specialized and systematized effort. In marked contrast with the representation that might be made of ye ancient apothecary, or even the modern one, who attempts to serve milkshakes, base-ball bats and tobacco while making urethral bougies, or while adjusting a volumetric solution.

The one single blemish spoken of in connection with our separate-

CHECK
FOR
PRESCRIPTION

265420

HYNSON, WESTCOTT & CO.,
Charles & Franklin Sts.,
BALTIMORE.

Time sufficient is as necessary for the proper preparation of a prescription as are care, competency, concentration of thought and pure material. We have an ample corps of careful and competent prescriptionists, in a commodious laboratory, away from distracting influences, where, with a comprehensive supply of pure and standardized pharmaceuticals and complete modern equipment we are able to do perfect compounding, but, withal, must have time; frequently more is required than is anticipated, because unlooked-for difficulties and complications appear. Be patient; we will let you go as soon as possible.

(*On reverse side*)

department idea is the absolute impossibility of satisfying impatient or hurried waiting parties that something is being done for them; nothing short of seeing some one at work for them will be satisfactory, and this cannot be offered. A small attempt is made upon the back of check, but it is a failure. Patient education seems to be the only remedy.

The effort made in some quarters to make capital out of an exposure of prescription-manipulation must necessarily result in imperfect work, since no hesitation, consultation or consideration is possible. It must all go through without a hitch, or the impression will be bad. Such a thing as a re-trial would be out of the question when, in fact, several trials are often necessary with the conscientious dispenser, no matter how able he may be. The inference, too, is discreditable. "Because I work in the open, others

who do not, have something to hide." The argument is without force. Who would enjoy his dinner more because the slaughter-house and kitchen were in sight, though both were scrupulously clean and the operatives were as perfect in technique as is the modern surgeon. Even this model of cleanliness and care is not in the habit of exhibiting his work to the family and friends of his patient. Did it ever seem necessary to the analyst or bacteriologist that his work should be more acceptable because a layman witnessed? If a manufacturing department is, as must be, a part of our establishment, it should be in the same large room in which dispensing is done, or very closely connected; because the two work together admirably, and the one helps the other. Indeed, for a strictly retail and supply business, these two or three departments should be linked under one head.

With ability and facility to apply pharmacopœial tests, one can buy so much more advantageously. Not only can he save much but he can win confidence and respect by employing the modern methods of standardization to satisfy his conscience that what he dispenses conforms to the requirements of the Pharmacopœia; he instills into his business a personality which brings commendable pride and consequent content.

Advancement in medicine and surgery has encouraged this progress and made it necessary. Advancement in pharmaceutical education has made it possible. Positive evidence is here given of the ability of our colleges of pharmacy to meet the demands of the hour. The practitioner of pharmacy to-day *must* be educated, must be scientifically trained.

Empirical practice will not answer and the fittest will survive. That point in progress has been reached where educated persons are needed in every department of pharmaceutical practice. The apprentice is a thing of the past; modern methods leave no place for him. No one has time to watch or teach him. Of what use is he? He can run errands, but soon outgrows that. He might be a receiving clerk, but before he has learned this he thinks he should earn more than one can pay for one to receive and mark goods. He will not make a stock clerk, because lacking in the judgment necessary. He cannot become a student and attend college, because he stopped school too soon. He is out of place. Your porter must be sufficiently heavy to handle large cases, barrels, etc., and

have judgment enough to attend to the furnace, deliver and ship goods. Your janitor must be a janitress, because a woman will not be sent out on errands and, besides, women are better cleaners than men. She can also do the laundry work of the establishment; keep plenty of clean towels and the sleeping-room in order. You must have a second woman, an experienced dishwasher, to keep your laboratory in order, bottles washed and utensils cleaned. A good woman in this position is not only a comfort but a money-saver as well, since she breaks so very much less and cleans so very much better than boys. Your receiving and stock clerk must be a woman, because she will remain in the position at a moderate salary, and will become more and more valuable with each year's service.

Compare this well-ordered detail with remembrances of proprietors and assistants wasting their valuable time washing graduates and mortars or, with the boys and clerks, sweeping the store, washing windows or sweeping pavements, as of old, and you will see unmistakable evidences of progress. The pharmacist doing business to-day who does not appreciate the helpfulness of educated and college-trained assistants is most unfortunate. He has either never seen the real, or is so incompetent himself as to be unable to recognize it.

Modern drug-store methods comprehend immense variety, great length and breadth. With even so much science behind him the pharmacist of today must make method and sometimes straighten the way. If, perchance, he sells oxygen he may wish to be assured of its purity. He deems its estimation an easy task, but finds upon trial that phosphorus will not burn spontaneously in pure oxygen. Strange but true. He then somewhat ingeniously applies the electric spark; the result is generally disastrous to his glass vessel or unsatisfactory, because of the extreme violence of the reaction. If the phosphorus is introduced into a mixture of equal parts of atmospheric air and oxygen the phosphorus will continue to oxidize slowly until all oxygen is combined, when the result is easily obtained by deducting the amount of nitrogen contained in the quantity of air used. Several trials proved the constancy of the proportion of the two gases in atmospheric air; it varies but very little from the accepted, one to four. The peculiar behavior of phosphorus in pure oxygen seems to be due to the sudden formation of a coating of oxide in such condition as to effectually protect the phosphorus.

This interesting estimation of oxygen is left for the moment while so small a matter as wrapping paper is looked after and which is brought before you to illustrate how closely we sometimes cling to the old. One pictures many drawers full of cut paper with counter and drawers and floor littered with smaller or larger pieces of wrapping paper—an eyesore and a sore waste. Why! even to-day one can see, in reality, on the counters of some of our finest stores, paper "in the flat," with huge shears lying near, with which to cut the size desired, and waste and litter again. Why not rolls and cutters? Three sizes—6, 9, 12 inches of white, and three sizes —12, 18, 36 inches of Manila, will meet every want and leave only satisfaction and comfort. But what a descent! From the estimation of gases to—wrapping paper! Yet, just such is our calling and such are its demands. In and around it one can find interesting subjects, attractive groupings, upon which the pencil can be used with most refreshing results. Science and art, manufacture, dispensing, test and assay. Competent verification, accurate standardization, comprehensive production and scientific compounding. A variety, but a most consistent variety. All actually and profitably practised.

The dream of eighteen hundred and ninety is the realization of nineteen hundred and one.

SPONGES:

WHERE THEY LIVE, HOW OBTAINED, AND THEIR USES.

By Albert Hart.

Sponge belongs to the animal kingdom, and the principal ones used commercially are obtained off the coasts of Florida and the West Indies; the higher grades are from the Mediterranean Sea, and are numerous in variety.

A sponge in its natural state is a different looking object from what we see in commerce, resembling somewhat the appearance of the jelly-fish, or mass of liver, the entire surface being covered with a thin, slimy skin, usually of a dark color, and perforated to correspond with the apertures of the canals, commonly called "holes of the sponge." The sponge of commerce is, in reality, only the skeleton of a sponge. The composition of this skeleton varies in the different kinds of sponges, but in the commercial grades it con-

sists of interwoven horny fibres, among and supporting which are spiculæ of silicious matter in greater or less numbers, and having a variety of forms. The fibres consist of a network of fibrils, whose softness and elasticity determine the commercial quality of a given sponge. The horny framework is perforated externally by very minute pores and by a less number of larger openings. These are parts of an interesting double canal system, an external and an internal, or a centripetal and a centrifugal. At the smaller openings on the sponge's surface channels begin, which lead into dilated spaces. In these, in turn, channels arise, which eventually terminate in the large openings. Through these channels or canals definite currents are constantly maintained, which are essential to the existence of the sponge. The currents enter through the small apertures and emerge through the large ones.

The active part of the sponge; that is, the part concerned in nutrition and growth, is a soft, fleshy mass, partly filling the meshes and lining the canals. It consists largely of cells having different functions: some utilized in the formation of the framework, some in digestion, and others in reproduction. Lining the dilated spaces into which different canals lead are cells surmounted by whip-like processes. The motion of these processes produces and maintains the water currents, which carry the minute food-products to the digestive cells in the same cavities. Sponges multiply by the union of sexual products. Certain cells of the fleshy pulp assume the character of ova, and others that of spermatozoa. Fertilization takes place within the sponge. The fertilized eggs, which are called larvæ, pass out into the currents of the water, and, in the course of twenty-four to forty-eight hours, they settle and become attached to rocks and other hard substances, and in time develop into mature sponges. The depth of the water in which sponge grows varies from 10 to 50 feet in Florida, but considerably more in the Mediterranean sea, the finer grades being found in the deepest water, having a temperature of 50° to 57°.

The method of obtaining sponges in the Mediterranean is by means of divers with apparatus, though this was prohibited by the Turkish government many years ago, but not adhered to, owing to the lack of support by the Greek government, and to excessive fishing, thus deteriorating the sponge beds, which require about three years to properly develop. As a consequence, these goods have be-

come scarce and greatly enhanced in value. A diver usually stays below the water a half to one minute, gathering what he can in the meantime, though, with apparatus, he can remain below the surface a considerable time. His work is very hard, owing to the pressure of the water. He is trained to his work when very young, and seldom lives more than thirty years. In the Florida and West India waters the fishing is done in flat-bottom boats, called dinges. A tin or wooden pail with a glass bottom is used to help locate the sponges, by lowering it into the water and looking down through it. When located they are brought up by means of a long pole, about thirty feet long, with a sharp-curved, double hook, by which means they are detached and brought to the surface. After obtaining a boatload it is laid out to decompose, a process better observed from a distance, owing to the obnoxious odor. They are laid out in kraals on the beach, and so washed by the sea. After the cleaning process they are taken to the market and sold to the dealers, who are experts, the highest bidder becoming the purchaser. They are then sorted and packed into bales according to size and quality. Of commercial sponges there are many different varieties, namely: sheepswool, velvet, yellow, grass, glove, reef, hardhead, and wire, emanating from Florida and the West Indies, each variety having several different grades, the Mediterranean giving us honeycomb sponges, commonly called "Turkish bath," "Turkey sponges" (*i. e.*, silk surgeon sponges), leather sponges (*i. e.*, elephant ears or washrag sponges), there being also several different grades of each variety. Sheepswool are named Rock Islands (Exhibit No. 1), Key (Exhibit No. 2), Matacomby (Exhibit No. 3), obtained from Florida, Abaco (Exhibit No. 4), Cuba (Exhibit No. 5) and Nassau (Exhibit No. 6), from the West Indies, their names being given in order as to quality, the most valuable being Rock Islands, which are of a strong fibre and best form, being most valuable for carriage washing and heavy work. This grade also makes fine bath sponges, either bleached with permanganate of potash, muriatic acid and oxalic acid, which makes them a white color. and then washed in a bath of sal soda or lime water, thus neutralizing the acid and changing the color yellow or lemon. This method, however, greatly weakens the fibre of the sponge, thus ruining it as regards durability. A better method, though not so pleasing to the eye, is to wash the natural sponge in a weak solution of oil of vitriol (Exhibit No. 7 to

compare with Exhibit No. 1), say one part of acid to twenty of water, allowing them to remain in until the dark color is taken out of the sponge, then thoroughly washing in water. This process does not injure the sponge, and makes it look cleaner.

Key sheepswool is a good form, soft and close fibre, lacking strength, owing to the iron in the sponge, which is signified by a bright-red color at the root and running entirely through the structure of the sponge. It is extensively bleached and looks nice, but wears badly, owing to the excessive use of acids necessary to abstract the iron from the sponge.

Abaco sheepswool somewhat resembles the Rock Island, though lacking its strength.

The Cuba sheepswool resembles the Key variety, being lighter in color.

The Nassau being the coarsest grade and is irregular as regards the horny fibres, firmness and shape.

The velvet sponges (Exhibit No. 8) of which there are several varieties, *i. e.*, Abaco, Cuba and Cay from the West Indies, also a hard variety from Florida, are much used as cheap carriage sponges and for general purposes, being moderate in price. The Abaco Exhibit No. 9) and Cuba velvet are the best, and much resemble sheepswool. A large hole at the top of this sponge spoils its utility. The Cay variety is the one largely used, being more abundant. The Florida velvet is coarse and hard, and is not generally liked, except for certain manufacturing purposes. Owing to a hole in the top of this grade of sponge many people prefer the cut sponges, *i. e.*, the large sponges cut up and trimmed, thus obtaining a nice solid sponge minus the holes. The yellow (Exhibit No. 10) sponge has also several varieties—Nassau, from the West Indies; Key and Matacomby, Florida, which are a good shape, but rather brittle, and are used chiefly among the painters, bricklayers and for household purposes. The best of these are the Matacomby and Key. There is also a species of yellow sponge called "hard head" (Exhibit No. 11), and this is what its name implies—a "hard" sponge. One variety, however, from Cuba (Exhibit No. 12) has a fine texture and is soft, though somewhat brittle, and is valuable, bleached, to take the place of a surgeon sponge.

The grass sponge (Exhibit No. 13) is of a very poor species and very low in price. It is chiefly used for manufacturing purposes by

painters, stone-masons, bricklayers, etc. The best quality and nicest shapes are bleached and sold on the market for a cheap bath sponge and are as good in appearance as the higher grades, but give no satisfaction in wear.

The reef sponges (Exhibit No. 14) are fine in texture, but lack strength, are extensively bleached for toilet purposes, and used by manufacturers and engravers.

Sponges from the Mediterranean sea are superior in quality to either the Florida or West Indies. The horny fibres being far less pronounced, they do not develop to the same thickness. They are finer in texture and more pliable, and grow in deeper water, having a surface temperature of 50° to 57° in winter, which is clearer and more free from impurities and the more difficult to obtain. The various grades are called white Turkey, *i. e.*, silk surgeon sponges; brown Turkish, *i. e.*, Zimocha, being similar to the silk sponge, only coarser and darker in color; leather sponges, *i. e.*, wash-rag or elephant's ears and honeycomb sponges; all of which have several different varieties. The best varieties are Mandruka Turkey cups (Exhibit No. 15), deriving their name from their formation, similar to a cup; Turkey solids (Exhibit No. 16) which are the same variety, only solid, as the name implies. The leather sponges (Exhibit No. 17) are thin, flat and fine in texture, used chiefly for manufacturing purposes and used considerably in Europe by veterinary surgeons. Brown Turkey, *i. e.*, Zimocha sponges (Exhibit No. 18) is similar in texture to a silk sponge, but brittle. It is chiefly used in Europe for a horse sponge and also for manufacturing purposes. Honeycomb sponges are various in quality, these being known as Mandruka (Exhibit No. 19) and found in deep water, are perfect forms, and have a close fibre and no horny fibres protruding from the surface, and are characteristic for their small root. This latter fact should be borne in mind in selling sponges. Many people object to large holes in the sponge, whereas, the root is the chief factor in determining its strength. The "catch" of this grade is diminishing yearly, thereby enhancing their value, consequently only a few dealers import them, the largest supply coming to Philadelphia.

Next in quality comes the Bengaza (Exhibit No. 20) a sponge similar to the Mandruka, though somewhat coarser, but a nice shape and strong, and is usually solid as a "Mandruka." This sponge grows in deep water. The cheaper varieties of honeycomb, *i. e.*,

Turkish bath (Exhibit No. 21) are found in shallow water and are numerous in variety, quality varying according to depth at which they are found. They are chiefly bleached, only the finest selected being used in their natural color.

The question of propagating sponges has been discussed both as regards Florida and Mediterranean sponges, and the idea is believed to be feasible. The method is as follows: Sponges cut into small pieces will live and grow if properly attached in suitable water (clear and free from impurities). They can be cut on a moistened board with a knife or a fine saw. Care must be taken not to express the soft matter. The preferred size of the cuttings is about 1 inch broad and similar in height. The outer skin should be retained as far as practicable. In cutting, the lines of the circulating canals should probably be considered, although pieces cut without any reference to the direction of the canals have lived and grown. Exposure is not injurious, unless exposed too long or in very warm weather. The clippings must then be made fast, care must be taken to use material that is not injurious to the sponge and will not distort its growth. They must be fastened on the bottom in an upright position that can be maintained, and not smothered by mud, sand or sediment. The use of bamboo pegs seems to have given much satisfaction and good results attained in as short a time as a year.

Owing to the great advance in the cost of sponges during the last few years, due to the scarcity and the results of overfishing and increased demand, of which the European market has been a factor, the packers in Florida have resorted to loading sponges to keep down the price, so as to appear to continue asking the former prices, whereas in reality, the cost is 20 to 35 per cent. higher. There are several methods of accomplishing this, such as injecting into the sponge sand and marble-dust; also by washing the sponges in a salt solution and by injecting glucose and heavy syrups. In fact, so heavy do they endeavor to load them that it is a wonder that the Government did not contract for loaded sponges for their cannon in its late war with Spain. Dealers now offering pure sponges free from sand and foreign matter are practically ridiculed by retailers, when quoting $1 and $1.50 per pound higher than their competitors offering loaded sponges, though they are offering the better and cheaper article and not likely to scratch or spoil a highly

polished article. To compare the difference between a pure and loaded sponge, take a 2-ounce sponge of each grade, wetting them both up, and it will be found that the pure article will measure about nineteen inches in circumference, or thereabouts. The loaded article in comparison will only measure about sixteen inches in circumference and less. Of course, this will largely depend upon the amount of foreign matter contained therein, the average herein given being taken from a bale of each kind and measured. Take a sponge of equal weight, say 2 ounces, costing $4 a pound and pure, and a loaded sponge at $3 per pound, and it will be seen that by washing them out you are getting a larger sponge in the 2-ounce pure than in the 2-ounce loaded, and therefore the cost is practically equal, despite the fact of there being $1 difference per pound in the price. A bale of pure sponges averaging eight to the pound at $4 a pound will be as large if not larger than a loaded bale about six to the pound, at $3 per pound. The cost of both of these per sponge is 50 cents. The purchasing of loaded sponges should, therefore, be avoided, it being iilustrated that as good value, if not better, can be obtained by paying the higher price.

Many dealers are now offering sheepswool by the piece, a stated number of sponges being packed in a bale, and this method is commanded, saving the retailer the trouble of figuring the individual cost of each sponge, and sometimes unconsciously losing their profits by not taking into consideration the difference of gross weight at which the sponges are usually purchased and the net weight, and even a possible loss from the sponges drying out. In this connection we would say that sponges in bales absorb the humidity in the summer-time, and are usually more or less damp, whereas, in the winter-time, they lose in weight, owing to the dryness of the air.

A METRIC MEDICINE GLASS.

By M. I. Wilbert.
Apothecary at the German Hospital, Philadelphia.

One of the most potent reasons why the metric system of weights and measures has not made more rapid progress in general favor or, what to us pharmacists is of more importance, in the practice of medicine and pharmacy, is the fact that the general public, and even doctors and some druggists, have no well-developed ideas of metric

quantities until they have converted them into the more familiar system of ounces and pounds. For example, 200 c.c. represents nothing tangible to the average mind until the person has converted this term into the approximate equivalent of six and three-quarter ounces. In other words, we have not as yet accustomed ourselves to think in decimal quantities, but continue to think of and to figure out quantities in ounces and fractions and subsequently attempt to transpose them into their metric equivalents. This process is not only tedious; it is also uncertain and, to a certain extent, dangerous, as a person who must necessarily transpose from one system to another cannot have an exact knowledge of the approximate values of weights and measures of the system that he is transposing into.

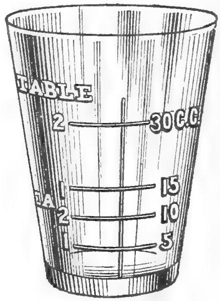
This is a point that should not be lost sight of, and especially in the metric system, where the simple displacement of a figure means the mistake of ten or a multiple of ten.

But even in cases where an actual and sincere attempt has been made to use the metric system in the prescribing and dispensing of medicines, we have an impediment in the accepted approximate-values of capacities assigned to the various household utensils that are commonly used to measure out doses of liquid medicines. Thus, for instance, custom has sanctioned the practice of accepting the capacity of a teaspoon to be a fluid drachm, and a tablespoon to be equal in capacity to four teaspoons, or to hold approximately half a fluid ounce. Now, any one who is sufficiently interested can readily prove to himself that not only do the various spoons differ considerably in their actual capacity, but that the average capacity of an ordinary teaspoon is much greater than that usually assigned to it. You will also find that but few tablespoons will hold more than the equivalent of three teaspoons.

It is true that in many cases a glass medicine glass or tumbler has displaced the more domestic method of measuring with the actual spoon, and that by this means we are able to give more evenly divided doses; still, even our glass medicine tumblers do not always hold the exact quantities that the graduations would indicate, and in others where the graduations are correct the tumblers are of such a shape that absolutely accurate results would be difficult to obtain, even by an expert.

But what we wish to call particular attention to is the fact that in transposing these approximate capacities into their metric equiva-

lents, we find that they do not fit in well with the decimal system of notation. In round numbers these equivalents would be 4 and 16 c.c. As square numbers require considerable thought when used as decimals, the sums resulting from their multiplication are usually inconvenient and awkward, and do not even-up into full round numbers, it will readily appeal to any one, that to use a decimal system to advantage all the factors must, or should, fit into and be well adapted to use in decimal notation. To overcome, as much as possible, any tangible objection or obstacle to the use of, or the ready acquisition of a working knowledge of, the metric system, we have devised a medicine glass that would conform more readily with a decimal system of notation. This medicine tumbler is graduated so as to conform with the approximate equivalent of a teaspoon as recognized in France and other countries that have adopted the metric



A Metric Medicine Glass.

system. In these countries the teaspoon is taken to be the equivalent of 5 c.c., and the tablespoon is taken as the equivalent of 20 c.c., or four teaspoonsful. In this latter particular our tumbler differs from the usually accepted ideas, as the tablespoon is graduated to the equivalent of 15 c.c., or three teaspoons. This we think represents more nearly the approximate relation between a tea and tablespoon of average capacity, and, in addition to this, comes nearer the generally accepted value of capacity for the tablespoon as used in this country at the present time.

This particular medicine tumbler is of the pressed-glass variety, with markings on the inside. The graduations, however, are now etched in, in preference to the moulded graduations that were used at first. These moulded graduations were found to be far from sat-

isfactory, as each succeeding lot of tumblers varied considerably from the supposed capacity. To overcome any possible chance of variation, the manufacturers now engrave the lines on the outside of the tumblers after annealing the glass.

With us in hospital practice the terms tea and tablespoons are gradually becoming obsolete, and doses of liquid medicines are usually referred to as being 5, 10 or 15 c.c., always using the abbreviations for cubic centimetres.

The obvious advantage to be derived from the use of decimal figures will appeal to any one who is not an expert mathematician, or a lightning calculator. By giving 10, 20 or 30 doses of either 5, 10 or 15 c.c., the required multiplication is rapidly and readily accomplished with little possibility of error. In addition to this, by confining himself to full decimal quantities, the physician never has any difficulty in either estimating the number of doses in a bottle of given capacity, or in making up the number of doses he wishes to prescribe.

In conclusion, the writer would like to say that, if any physician or pharmacist will get into the habit of thinking quantities in decimals, he will never have occasion to question the superiority and advantage of the metric system over the heterogeneous and complicated systems of weights and measures now used in this country.

THE CAPACITY OF SPOONS FOR ADMINISTERING MEDICINES.

By C. B. Lowe.

My attention being directed to the capacity of the spoons in common use I have made some investigations of the matter. Remington's "Pharmacy" gives their capacity as follows, viz., "Teaspoonful = fʒi, dessertspoonful = fʒii, tablespoonful = fʒiv," but afterwards states: "In almost all cases the modern teacups, tablespoons, dessertspoons and teaspoons, after careful tests made by the author, were found to average 25 per cent. greater capacity than the theoretical quantities given." White and Wilcox's "Materia Medica" gives the following list, viz., "A teaspoonful is about a fluid drachm (4 c.c.); usually it is a little more, viz., nearly 5 c.c A dessertspoonful is about two fluid drachms (8 c.c.). A tablespoonful is about

half a fluid ounce (15 cc.); usually it is almost 20 c.c." I have tested a number of spoons, such as are in common use, filling each with distilled water to its full capacity and then measuring the amount. The following results are given: No. 1 (a small teaspoon) contains 75 m.; No. 2, 85 m.; No. 3, 100 m.; No. 4, 100 m.; No. 5, 110 m.; No. 6, 110 m.; No. 7, 120 m.; No. 8, 120 m.; No. 9, 120 m.; No. 10, 130 m., the average being 107 m. (about 7 c.c.). As Nos. 2 and 3 are each known to be 100 years old, we might infer that there has been an increase in the size of teaspoons, as the rest of them are of much later date. Of the three dessertspoons shown you their capacity is as follows: No. 1 (modern), 3 fluid drachms; No. 2 (80 years old), full 3 fluid drachms; No. 3 (50 years old), scant 4 fluid drachms. The six tablespoons shown you have a capacity as follows: No. 1 (100 years old), 4 fluid drachms; Nos. 2, 3 and 4 (modern), each 5 fluid drachms; No. 5 (60 years old), full 5½ fluid drachms; No. 6 (modern), 6 fluid drachms. When filled with strong alcoholic tinctures, such as Tinct. Cinchona Comp., they contain about 10 per cent. less, owing to the fact that the cohesion between the molecules of alcohol is less than that between the molecules of water. Filled with tinctures made from diluted alcohol, such as Tinct. Digitalis, they contain about 5 per cent. less than they do of water. Filled with syrup, such as Syr. Pruni Virg., the amount is about the same as that of water, but about 10 per cent. adheres to the spoons and cannot be measured. My conclusions are as follows, viz.: In actual practice few persons fill spoons perfectly full with medicinal liquids, but only approximately so, therefore, by the use of the average teaspoon the patient would get about 50 per cent. more than the theoretical quantity. The average dessert and tablespoon would give about 25 per cent. more. As the teaspoon is the measure by which liquid medicines are ordinarily administered, this average increase in size of 50 per cent. becomes a matter of some consequence, especially when maximum doses of active drugs are prescribed. For instance, a physician might think he was giving the $\frac{1}{16}$ of a grain of strychnine, whereas by the ordinary teaspoon the patient would get $\frac{3}{32}$ of a grain, or nearly $\frac{1}{10}$. Or 4 m. of hydrocyanic acid might be prescribed as a dose, but the patient would get 6 m. This disparity between theory and practice is partially recognized by some physicians; one that I am acquainted with always prescribes a 2½-ounce mixture when he wishes the patien

to get 16 teaspoonfuls; a three-ounce mixture would give him exactly what he wants.

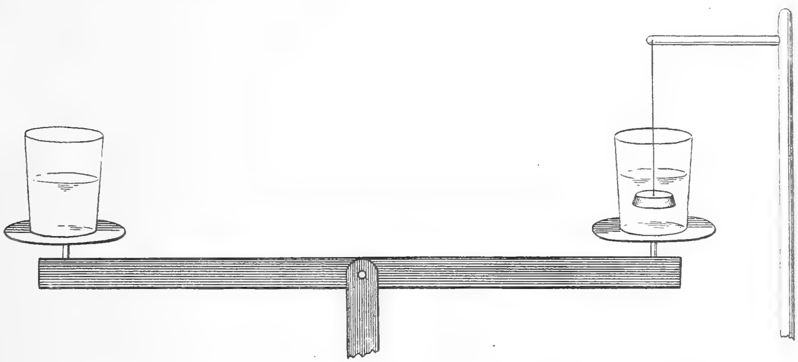
Professor Wilcox's comment upon the domestic measures should be widely circulated. He says: Spoons, glasses, and cups vary so much in capacity that it is never safe to prescribe solutions of powerful drugs to be measured by them. The use of glass graduates, which can be obtained accurately marked, should be insisted upon.

NOTE ON THE DETERMINATION OF SPECIFIC GRAVITY.

By Robert A. Hatcher, M.D.

The accompanying diagram illustrates a method of taking specific gravity which has not been widely used (if, indeed, it has ever been suggested), with an ordinary box prescription scale.

A beaker containing water is balanced upon the scale, and having weighed the article in air, it is then suspended so that it is wholly immersed in the water but does not touch the bottom of the beaker.



Determination of Specific Gravity with a Prescription Scale.

The weight now required to restore the balance is the weight of the water displaced, and it equals the loss of weight of the substance in water. The specific gravity is found by dividing the weight in air by the loss of weight in water, the result being the specific gravity sought.

EDITORIAL.

BIO-CHEMICAL ANALYSES AND THEIR VALUE.

In an editorial in the March number of *Pediatrics* on the "New Diagnosis" occur a number of statements which are rather suggestive and have a wider significance than simply to the modern physician for whom they were written. By the "New Diagnosis" is meant "the recognition of various types of disease by the assistance of the new discoveries in bacteriology, physics and chemistry; many of them rendered practicable by the newer forms of the compound microscope. These discoveries are familiar enough—the tubercle bacillus, the malarial parasite and many more. But the speed with which announcements of scientific achievement have succeeded one another has perhaps blinded a part of the profession to the fact that there is just as much room to-day in the practice of medicine for the educated fingers, eye and ear as there ever was. The new field of work has not replaced the old; on the contrary, both fields remain, both must be examined, both gone over from end to end before a diagnosis can as a rule be considered secure. Diphtheria bacilli in the throat do not prove diphtheria unless the patient has symptoms; the diazo-reaction in the urine, or the Widal test with the blood, must be taken as coördinate evidence along with these spots; the nose-bleed, the splenic tumor, and the fever, before us may certainly say 'typhoid.' The new diagnosis has *complemented* the old in a manner that has proved and will prove infinitely beneficent. But there is no fair ground to hope or even to wish that the chemist and the microscopist shall supersede the alert and well-educated 'all-round' physician. As they say in Germany, 'You can't turn a man into a test-tube.'"

In an editorial in this JOURNAL (February, 1899) on "Germs and Disinfection," attention was directed to the fact that those who understand least of the nature of germs and disinfectants are likely to be most deluded by the subject. It is said that some time ago "a gang of coalers at Hull refused to discharge a cargo of coals until they had been disinfected." While Dr. Koch, when he made his first visit to the Hamburg hospitals, found everything prepared in the most correct style, and on his finishing with the first ward, being invited in the usual manner to wash his hands with the most scientific soaps, disinfectants, etc., he declined, observing, nonchalantly, "There will be plenty of time for that presently."

A worker in making microscopical examinations for physicians observes (*Pediatrics, loc. cit.*) that his patrons may be divided into three classes, of which the largest class are "those who know neither how to prepare their specimens nor what help the microscope can possibly afford them in a troublesome diagnosis. These men send fermenting urine in dirty bottles to be tested for 'typhoid bacilli;' plump and blooming boys to 'have their red cells counted,' patients who have not had a chill or an elevated temperature for months to be examined for 'malaria,' or bits of tough beefsteak passed *per rectum* as probable specimens of 'carcinoma of the colon.' * * * Perhaps these men last named have the ultimate motive of impressing the patient with a notion of their own omniscience; but there is no honest word to be said for such performances except—*quackery*."

Modern methods of research have thrown a wonderful light on not only diagnosis in medicine, but the valuation of economic products in general. As in medicine, so in these fields: the newer biochemical methods have complemented the old in a manner that is beneficent, and there is no ground for supposing that all five senses with the man of common sense cannot be turned advantageously to account.

In the discussion which followed the reading of a paper on "Spanish Saffron" at the Pennsylvania Pharmaceutical Association (Proc., 1898, p. 109), M. N. Kline said that the English women who used saffron know good saffron when they see it. He said that they know from practical use how to select the best quality, even though no one might be able to assign the reason how they determined this.

It is well known how "many large importers of tea, coffee and cacao employ a taster or tester to determine the grade of the material imported. Long experience enables these men to detect by taste very slight variations in quality. Manifold repetitions of the operation enables them to become familiar with every shade of agreement between the taste of a sample and the appearance, feel and smell of it. In this way all the senses become able to share in the work of determining the quality of the sample, the presence of adulterants, facings, etc. The determination of the kinds of adulterants is largely a matter for chemistry and microscopy. In grading wool, cotton, etc., dealers depend upon the length of staple, amount of dirt, fineness of fibre, strength of fibre, uniformity of the

lot, etc., as revealed to them by their senses of sight and touch. Experience gives them skill to form an approximately correct estimate of the value of a sample, especially of its adaptability to any particular use to which they may wish to put it. It is very much like buying fruit—you look at it, feel it and taste of it, and thus judge of its condition. If it suits your desires, your tastes and your pocket-book, you buy it."[1]

There are likewise in drugs certain qualities which are not revealed either by the microscope or the test-tube, but which, nevertheless, are apparent to the physician who employs the drug. An article may be nearly exhausted of its active constituents and yet pass as the genuine so far as the microscope alone will demonstrate. One sample of drug may assay as much as another, and yet not do the work that is intended by the physician. So far as the microscopical and chemical tests are concerned, there must always be limitations in their employment. These can only complement the tests which have always been employed, and for which no reason can be assigned for the results that they give. They who succeed in putting out good preparations know in more ways than one how to pronounce on the value of a drug, and they see to it that no stone is left unturned (from the growing of the plant yielding the drug till its actual preparation, conservation and employment by the physician) to insure its doing the work intended by the physician. The true analyst is not only a microscopist, a chemist, a biologist, but a tester and taster, one who uses his five senses with an abundance of common sense, backed by a good training. The future has much in store for the specialist who is an all-round man, with all his senses developed, and who tastes and feels and sees as well as uses the microscope and test-tube.

REVIEWS AND BIBLIOGRPAHICAL NOTICES.

A TEXT-BOOK OF PHARMACOLOGY.—Including Therapeutics, Materia Medica, Pharmacy, Prescription-writing, Toxicology, etc. By Torald Sollmann, M.D. Royal octavo volume of 880 pages, fully illustrated. Philadelphia and London: W. B. Saunders & Company, 1901. Cloth, $3.75 net.

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[1] **Extract from a letter from Wm. B. Marshall, Curator of the Philadelphia Commercial Museum, July 13, 1899.**

In this work the author has not only brought together the facts relating to the pharmacological study of drugs, but has also given in Part I a rather comprehensive treatment of the preparation and prescribing of medicines, as well as an outline of toxicologic analysis. The most valuable portions of the work are Parts III and IV, in which are given practical exercises in experiments on animals, frog-work, work on mammals, and method of analyzing the causes of pharmacologic action. While Cushny, in his Pharmacology, considers it probable that pharmacy will occupy a still more subordinate position in medical education, Sollmann seems to consider that a knowledge of pharmaceutic methods, and even pharmacognosy, is necessary to the education of the physician. It matters not which view is favored; it would seem that it is a mistake to include so much of these subjects in a work of this character as has been done by Sollmann. The work, while based on the teachings of Schmiedeberg, shows much originality and is a valuable contribution to the text-books on the newer pharmacology, the intimate relation of which to practical medicine is becoming more and more evident as progress in medicine is made. It is works of this character that interest the pharmacist who is likely in the near future to appreciate the pharmacological valuation of animal and vegetable drugs.

Materia Medica, Pharmacy, Pharmacology and Therapeutics. By W. Hale White, M.D., F.R.C.P. Edited by Reynold W. Wilcox, M.A., M.D., LL.D. Fifth American Edition, thoroughly revised. Published by P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia. 1901. Price, $3.00 net.

This popular work has been referred to on previous occasions in this Journal. The new edition has been thoroughly revised and twelve pages of new matter added. It is one of the most condensed and most valuable of the works on therapeutics, and is a valuable aid to students and practitioners alike.

The Medical Plants of the Philippines.—By T. H. Pardo de Tavera, Doctor en Medicina de la Facultad de Paris, Comisionado Cientifico de S. M. en las Islas Filipinas y Delagado en las Mismas de la Societe Academique Indo-Chinoise de Francia, Miembro Fundador Correspondiente de la Sociedad Espanola de Higiene, etc. Translated and revised by Jerome B. Thomas, Jr., A.B., M.D. Published by P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia. 1901. Price, $2.00 net.

This work was written with the special object of facilitating the study of the native medicinal plants by the numerous medical officers stationed at small posts throughout the Philippines. The author has given the common names, botanical origin, botanical description, habitat, constituents and uses of the drugs considered in the book. A very large number of the plants enumerated are employed in medicine throughout the civilized world. A number of the other plants have been known to be used in India, the East Indies, and other tropical countries. The plants mentioned, which are peculiarly indigenous to the Philippines and which may prove of value in medicine, are relatively few, if any. The work, at any rate, may form the basis for subsequent work, and it is not unlikely that some important and valuable medicinal plants may be established in these comparatively unexplored and interesting islands.

Die Mikroskopische Analyze der Drogenpulver. Von Dr. Ludwig Koch. Zweiter Band. 1te Lieferung. Die Rhizome, Knollen und Wurzeln. Leipzig: Verlag von Gebrüder Borntraeger, 1901. Subscriptionspreis, 3 mk. 50 pf.

In this first part of the second volume are considered the anatomical elements of the rhizomes and their characteristics in the study of this class of drugs; also the microscopical characteristics of calamus, aspidium, galangal, hydrastis and iris. The present part merits the same commendation that the previous parts that have been issued have received in this Journal.

Die Rohstoffe des Pflanzenreiches. Versuch einer tecknichen Rohstofflehre des Pflanzenreiches. Von Dr. Julius Wiesner. 2te gänzlich umgearbeitete, und erweiterte Auflage. 6. Lieferung (Bd. II, Bogen 1–10), mit Textfigur 1–44. Leipzig: Verlag von Wilhelm Engelmann, 1901.

This valuable work, in the revision of which a dozen authors are engaged, has reached the 6th Lieferung, which is devoted to the consideration of the useful woods. The treatment of the subject is as follows: (1) Die Gliederung des Holzkörpers; (2) Der innere Bau der Hölzer; (3) Die äussere Structur der Hölzer; (4) Physikalische Eigenschaften der Hölzer; (5) Chemische Charakteristik des Holzes und der andern fibrösen Pflanzengewebe; (6) Uebersicht der wichtigeren Pflanzen, deren Holz technisch benutzt wird; (7) Specielle Betrachtung der wichtigsten Nutzhölzer; (8) Uebersicht

der hier beschriebenen Hölzer von Nadelbäumen nach mikroskopischen Merkmalen.

The woods yielded by the different species in 112 families are considered; the important references being given in connection with each of the species considered. The work is indispensable to those interested in technical products.

Das Komprimiren von Arzneitabletten. Von F. Utz. Mit in den Text gedruckten Figuren. Berlin: Verlag von Julius Springer, 1901. M. 2.40.

This valuable little book on the making of tablets is well illustrated and full of practical information on the construction of the different machines and the formulæ found useful in the making of tablets. It consists of the following parts: (1) Geschichtliches; (2) Komprimirmaschinen; (3) Nebenapparate; (4) Das Vorbereiten der Arzneimittel zum Komprimiren; (5) Allgemeine Vorschriften für Behandlung der Maschinen u. s. w.; (6) Das Komprimiren der Tabletten; (7) Die Bezeichnung der Tabletten; (8) Die Verpackung der Tabletten; (9) Die Aufbewahrung der Tabletten; (10) Verordnungen.

NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

The following are the officers of the Association for the year 1901–1902: President, James W. Seeley, Detroit, Mich.; First Vice-President, R. K. Smither, Buffalo, N. Y.; Second Vice-President, Thomas Voegeli, Minneapolis, Minn.; Third Vice-President, B. E. Pritchard, Pittsburg, Pa.; Secretary, Thomas V. Wooten, Chicago, Ill.; Treasurer, Rudolph S. Vitt, St. Louis, Mo.

The members of the Executive Committee are as follows: Simon N. Jones, Louisville, Ky., Chairman; James W. Seeley, Detroit, Mich.; F. E. Holliday, Topeka, Kan.; John C. Gallagher, Jersey City, N. J.; W. E. Bingham, Tuscaloosa, Ala.; F. W. Meisner, La Porte, Ind.; Charles Fleischner, New Haven, Conn.

The following are the resolutions adopted by the Association at its recent convention at Buffalo in conformity with the recommendation of the Committee on Resolutions:

Resolved, That we commend the forceful and able address of President Anderson and recommend that the thanks of the Association be tendered him for the discharge of the duties of his office

and the valuable recommendations contained therein, which recommendations have been voted upon in the different resolutions that follow:

Resolution "A." Organization.

Resolved, That the Secretary of the N.A.R.D. is instructed to proceed with the work of local organization throughout the country, subject to the sanction and approval of the Executive Committee, as rapidly as the condition of the finances of the Association and the training of competent organizers will justify.

That the Secretary is authorized, with the approval of the Executive Committee, to employ such organizers as the territory to be organized may seem to require.

That inasmuch as the formation of local associations and the adoption of schedules is calculated to bring immediate financial benefit to the members of such associations, it is directed that organization should be as nearly self-sustaining as possible, and the Secretary is authorized, with the approval of the Executive Committee, to provide for the collection from the members of such new associations of an organization fee, in addition to the annual dues to the N.A.R.D., of such amount as may be essential to meet, approximately, the cost of organizing the territory as thoroughly as it can be organized, and the Secretary shall issue to all organizations that may be formed a certificate of membership to each of its members, which certificate shall also show the affiliation of the association with the N.A.R.D.

That the organizers shall secure the adoption of a uniform schedule of prices by all organizations formed wherever practicable.

That all organization work conducted in a State in which the State pharmaceutical association is affiliated with this body shall be done with the advice, knowledge and co-operation of the State association.

Resolution "B." Reduction of Prices on Proprietaries.

Resolved, That inasmuch as the N.A.R.D. has been largely instrumental in securing the repeal of the stamp act on proprietary medicines, the Association feels strongly its right to expect that manufacturers who have advanced their prices to the retail trade to cover the cost of this tax should now reduce their prices to conform to those in existence prior to the imposition of the tax.

That we commend the action of those proprietors who did not

advance their prices on account of the imposition of the war revenue tax.

That we commend the action of the proprietors who promptly reduced their prices when the tax was repealed.

That the Secretary is instructed to prepare a list of all proprietors who advanced their prices and have not reduced them since the repeal of the tax. The Executive Committee shall consider any special reasons given by each of those manufacturers who have not reduced their prices, accompanied in each case by the recommendation of the Executive Committee with reference thereto.

Resolution "C." Non-Tripartite Goods.

Resolved, That while the tripartite plan is intended to control the sale of proprietary goods only, the Association desires to again commend the action of those manufacturers of pharmaceuticals and other products who have uniformly recognized the principles of the plan.

That we renew our recommendation that the goods of such manufacturers are entitled to preferential consideration at the hands of the drug trade.

That this recommendation be brought to the attention of every association in membership by the Secretary of the National Association.

Resolution "D." The N.A.R.D. Plan.

Resolved, That the results of the causes and plans of the N.A.R.D. during the past year for the betterment of drug-trade conditions is a practical demonstration of the benefits of organized effort and furnishes gratifying encouragement for the continuation of those policies and plans.

That we urge upon all manufacturers of goods sold to the drug trade and all jobbers the advantages to be gained from a loyal and vigorous maintenance of the plans jointly adopted.

That local associations not now reaping the benefits of the tripartite plan are urged to renew their efforts at organization upon such lines as will offer most satisfactory results, calling upon the Secretary and the Executive Committee for such assistance as they may deem necessary to success.

That in the enforcement of the tripartite plan all names intended to be listed as aggressive cutters be submitted to the Executive Committee; the Secretary shall duly list the names and notify the necessary persons.

Resolution "E." Change in Basis of Representation, etc.

The committee recommends that Article III on Membership be amended by the substitution of the following section for Section 2:

"Section 2. Each State and local association shall be entitled to one delegate for each fifty active members or fraction of fifty members. Such delegates shall be actively engaged in the retail drug business."

The only effect of the amendment above recommended is to change the basis of representation from one hundred members to fifty members, which, under a form of local organization throughout the country, would equalize the representation between the city districts more nearly than under the present basis.

We recommend that the fourth by-law be amended to read as follows:

"Fourth. The fiscal year shall be identical with the calendar year, and the dues of the affiliated associations shall be payable at the beginning of the fiscal year. The collection of the dues is placed in the hands of the Executive Committee, and the committee shall have power to drop from the membership-roll any association which has not paid its dues for any preceding fiscal year."

Resolution "F." National Legislation.

Resolved, That we commend the efforts of the Committee of National Legislation in securing the repeal of the stamp tax on medicinal preparations, and express appreciation for the assistance rendered by members of the National Wholesale Druggists' Association, the Proprietary Association of America, and any other persons in accomplishing the repeal.

Resolution "G." Trademarks and Patents.

Resolved, That in accordance with the suggestion of the Committee on Trademarks and Patents regarding pharmaceutical products, we reaffirm our declaration that it is an indispensable principle of justice that the Government should not grant a patent on the product itself, but should confine such patent protection to the process of manufacture. To patent the products is to create monopoly and retard progress in the healing arts.

That the Committee on Trademarks and Patents, in conjunction with the Committee on National Legislation, is instructed to prepare and distribute to the organizations in membership, through the office of the N.A.R.D., a memorial urging upon Congress favorable action on this subject.

That in the preparation of such memorial the said committee is requested to embody the suggestions contained in the proposed "Act Amending the Patent Laws of the United States" contained in the report of the Committee on National Legislation.

That all associations in membership and all retail druggists are urged to promote such favorable action by Congress at the earliest date practicable.

Resolution "H." Government Competition.

Resolved, That in accordance wich the recommendations of the Committee on National Legislation concerning the manufacture of vaccine and biologic products, the Association recommends that the bodies affiiliated with the N.A.R.D. use their efforts with their respective Congressmen to secure the discontinuance by the Government of the manufacture of these products in competition with private enterprise.

Resolution "I." Finances.

Resolved, That if it becomes necessary, in order to promote most actively the work of the Association, the Executive Committee may instruct the Secretary to ask for contributions from the associations in membership of such amount as they may feel inclined to make.

PHARMACEUTICAL MEETING.

The second of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1901–1902, was held Tuesday, November 19, 1901. Mr. William McIntyre, a well-known pharmacist of this city, presided.

The first speaker was Mr. Henry P. Hynson, Baltimore, who has contributed much during the past few years to the organization of the new section in Practical Pharmacy and Dispensing of the American Pharmaceutical Association. Mr. Hynson's paper was on "Modern Evidences of Pharmaceutical Progress and their Value" (see page 575). At the conclusion of the reading of the paper, the chairman stated that it gave those who were present an equal opportunity of returning their experience on this subject and invited a discussion, which proved very interesting indeed. In discussing the subject of the deterioration of drugs by vermin, Mr. Boring stated that he had found the use of chloroform to be very successful as a preventive. Mr. Campbell said regarding the sug-

gestion of Mr. Hynson on the employment of absorbent surgical gauze for wiping off capsules and using it generally in place of sawdust or paper for wiping ointment slabs, etc., that he had used absorbent cotton for the same purpose and thought it more advantageous. Mr. Boring, on the other hand, considered it better to use sawdust, and commended that portion of Mr. Hynson's paper concerning shelf-bottles, in which he said that "a good modern rule is to have only so many as will add to your convenience and none for show."

Mr. Gordon brought up the matter of preventing the stoppers of bottles containing syrups, solutions of alkalies, etc., from sticking, and stated that he found it advantageous to use mixtures of petrolatum with either wax, rosin or paraffin on the stoppers, and that he found the rosin and paraffin mixtures better for syrup bottles. Mr. Boring said that the late Dr. Squibb's idea of using a little petrolatum was all that was necessary to keep stoppers from sticking, and for syrups, thought the use of loose stoppers the best.

Professor Remington did not entirely favor the abandonment of cutting paper in required sizes for wrapping pill and ointment boxes, and thought it well to have separate shelves for this purpose, as well as the cylindrical roll favorably commented upon by Mr. Boring, Mr. Hynson and others. Mr. Hynson furthermore stated that he uses a box or carton wherever practicable, and that the great advantage from the use of cylindrical rolls was, that there was no waste. Dr. Lowe stated that he had been using for some time the "utility box" for epsom salts, borax and other substances, and found it very satisfactory. Mr. Campbell, who has a suburban store and a number of customers who drive up to the store, said that he facilitated matters by having a call-button attached to the hitching post for the use of these customers. In concluding the paper which had been put in this practical and interesting form for the benefit of the pharmacists present, Mr. Hynson commended the paper of Mr. Mason (see this Journal, p. 508) on "A New Economic Order in Pharmacy" and urged the younger men in attendance at the meeting not to start new stores, but combine several stores, as this was more satisfactory to the greatest number.

The next paper was on "Sponges" (see page 584), by Mr. Albert Hart. This was read by Mr. Wm. L. Cliffe. In the paper were described the sponges as they grow in the sea, the method by which

obtained, and their uses. The paper was illustrated by a series of specimens of sponges exhibited by the Smith, Kline & French Co., and included an old earthen jug upon which a large Mandruka sponge of fine quality had grown. A Zimocha toilet sponge and two fine specimens of silk surgeon cup sponges, all of which had become attached naturally to rocks; a peculiar specimen was a genuine large Abaco velvet sponge of perfect form, attached to a coral formation of peculiar shape, one part looking very similar to a pineapple; a set of four pictures showing "a diver being dressed to descend," "a diver preparing to descend," "a diver surrounded by curious fish," and "a typical view where sponges abound;" also a large tortoise, nearly 3 feet long, its shell having been polished, and a sample of every known variety of sponge used commercially (the most interesting of these being a perfectly formed Mandruka bath sponge measuring about 18 inches across), added interest to this interesting paper.

In answer to a question by Dr. Lowe, concerning the possibility of cultivating sponges successfully on the coral reefs of Florida, Mr. Hart took an adverse view and stated that, while experiments on a small scale had proven successful, the conditions for their development to produce a large crop were not practically attainable. They must be planted in clear water, water in which there is scarcely any motion, and at a depth of about 16 feet. He also stated that there were about $300,000 worth of sponges shipped from Florida annually, and that in the Mediterranean waters many of the beds had practically given out. In reply to a question by Mr. Hynson, he said that a certain variety of sponge is peculiar to a particular locality, and the clearer the water and the warmer the temperature the finer the quality of sponge. Mr. Hart also accorded with the view of Dr. Lowe that the Red sea was a favorable locality for the growth of sponges, and stated that some were obtained from this locality. The matter of the adulteration of sponges was also discussed. Professor Remington referred to the method of loading *bales* of sponges by the use of a mixture of barytes and red lead. Mr. Hart stated that at the present time they were washed in water with much sand, and that the sand dries in and the water dries out of the sponge, thus increasing the weight. In place of sand, salt and sugar solutions also were used.

M. I. Wilbert read a paper on "A Metric Measuring Glass" (see

p. 590). In this connection Professor Lowe read a paper on "The Capacity of Spoons Used for Administering Medicine" (see p. 593). In discussing these papers Mr. Peter P. Fox said that he recommends patients to use the old-fashioned teaspoon in preference to the modern teaspoon. Mr. Boring thought it important for the patient to purchase a medicine glass. Professor Remington said that he used to have his name on the medicine glass and give it away with the medicine. He also stated that his own experiments on the capacity of teaspoons, etc., alluded to by Dr. Lowe, were made with plated and tin teaspoons, and he suggested that Dr. Lowe continue his investigations with these. In reply to the question of the accuracy of the medicine glass, Professor Remington said that he had never found them to be inaccurate. As illustrating the importance of this subject, Dr. Weidemann brought to the attention of the meeting the fact that a physician had ordered a four-ounce mixture for a patient which was to be taken in teaspoonful doses every hour, and that in sixteen hours the prescription was brought back for renewal. Mr. Henry C. Blair, Jr., subsequently stated that a patient had recently complained to his clerk that a mixture did not contain the number of doses (or teaspoonfuls) that the doctor had said it would.

Mr. F. T. Gordon exhibited a collection of fifty-six of the metals arranged in a case, from E. Merck & Co. Among the specimens were a number of the rarer metals: rubidium, caesium, thorium, yttrium, Indium, tantalum, zirconium, etc., the whole forming a very interesting exhibit. The peculiarity of both gold and silver in mass and in powder was very striking. Gold in powder is an orange to brick-red, silver is pure white. Specimens of boron, silicon, selenium and tellurium were also included. It was remarked that if each of the tiny bottles containing these rare metals held an amount equal in weight to the specimens of copper or zinc shown, that the case would be worth perhaps over $10,000 which, as exhibited, was valued at $50.

Wm. R. Warner & Co. exhibited some elixirs. Among their products noted was elixir salicylic compound, after the firm's original formula, a remedial agent in rheumatism and kindred diseases; also tono sumbul compound, an elegant pharmaceutical product both in appearance and taste, possessed of valuable tonic properties.

A vote of thanks was tendered Messrs. Hynson and Hart for their valuable and interesting communications.

Before adjourning the secretary announced that the following provisional program had been arranged for the next meeting, on December 17th:

"The Origin, History and Influence of State Pharmaceutical Associations." By Joseph L. Lemberger, Ph.M.

"The Pharmacologic Assay of Drugs." By Dr. Arthur R. Cushny, University of Michigan.

"A Useful Method of Filling Capsules with Essential Oils." By William G. Toplis.

Various exhibits and some other papers are also expected.

H. K.

NOTES AND NEWS.

U. S. PHARMACOPŒIA.—By reason of the death of Dr. Charles Rice several changes have been made in the Committee of Revision, as follows: Chairman, Joseph P. Remington; First Vice-Chairman, C. Lewis Diehl; new member, Henry H. Rusby. The death of William S. Thompson, the Chairman of the Board of Trustees, has also necessitated some changes, as follows: Chairman, Charles E. Dohme; new member, J. H. Beal.

AMERICAN PHARMACEUTICAL ASSOCIATION.—Owing to the death of William S. Thompson, Chairman of the Council, Prof. A. B. Prescott has been elected Chairman, and Charles E. Dohme, Vice-Chairman.

CONFERENCE OF TEACHING FACULTIES.—At the recent meeting, held conjointly with the St. Louis meeeting of the American Pharmaceutical Association, the principal business transacted was to complete an organization. A constitution and by-laws were adopted. The following officers were elected: President Joseph P. Remington; Vice-President, Edward Kremers; Secretary and Treasurer, Wilbur L. Scoville. Executive Board, J. H. Beal, Chairman; Oscar Oldberg, William Simon, L. E. Sayre, E. A. Ruddiman.

CONFERENCE OF BOARDS OF PHARMACY.—At the St. Louis meeting of the American Pharmaceutical Association provision was made for a meeting of the Boards of Pharmacy. W. M. Searby was elected Temporary Chairman and A. Brandenberger, Temporary Secretary. Ten States were represented. It was decided that a committee be appointed, to consist of the Chairman and Secretary, to draw up resolutions requesting the Committee of Arrangements for the next meeting of the American Pharmaceutical Association to provide a space on their program for a conference of boards of pharmacy. It was also decided to appoint a committee, consisting of the Chairman, Secretary, and three members, to draw up a constitution and by-laws as soon as possible, and mail a copy of them to the Secretary of each State Board of Pharmacy, with the request that each board send a representative to the next annual meeting, to be held at Philadelphia. There was also a committee appointed to ascertain from the several boards of pharmacy the qualifications, percentage, etc., required of candidates for examination before certificates were granted.

THE NEW YORKER DEUTSCHER APOTHEKER VEREIN celebrated their fiftieth anniversary on October 1 with a large banquet. "Founded half a century ago by a few German druggists of New York, who met for the promotion of good fellowship and the advancement of pharmaceutical knowledge, the Association has become one of the most influential pharmaceutical organizations in the city."

STATE AID IN EDUCATIONAL WORK.—J. M. Cattell (*Science*, 1901, p. 575), in discussing the Washington Memorial Institution and a National University, says: "We shall not always depend on the charity of the rich, nor will our universities always be administered by business men. Pennsylvania, Johns Hopkins, and Cornell are turning to the State for help; Harvard, Yale, and Columbia must do the same if their prestige is to be maintained."

THE METRIC SYSTEM.—In a report to the British Association of Chambers of Commerce the following resolutions were adopted: "(1) That, after considering various suggestions, this committee is unanimously of the opinion that the chambers should unite in urging upon the Government the compulsory adoption of the metrical system of weights and measures, leaving matters of detail to be considered later; (2) That the Committee is unanimously of opinion that a British decimal system of coinage must be on the basis of retaining the sovereign, with the florin as a unit, divided into a hundred cents or farthings; (3) The Committee recommends that there should be metal coins of five and ten cents, and bronze coins of one, two and four cents or farthings."

THE HANBURY MEDAL was presented to Dr. George Watt, widely known as the author of "The Economic Products of India," on October 1st by the President of the Pharmaceutical Society of Great Britain.

RUDOLF VIRCHOW'S eightieth birthday (October 12th) was celebrated in Berlin with appropriate ceremonies. The Virchow research fund was increased by 50,000 marks; a new hospital containing 1,700 beds has been named in his honor; and the Emperor has conferred an order and a medal. In New York city there was also a banquet in honor of Virchow given on October 12th.

HORATIO C. WOOD has been granted leave of absence for a year from the University of Pennsylvania, and H. C. Wood, Jr., delivers the lectures upon the physiological action of drugs.

H. H. RUSBY delivered a lecture on "Production of Cinchona Bark and Quinine in the East Indies," at the New York Botanical Gardens, on November 9th.

JOHN URI LLOYD has written a new story "Warwick of the Knobs," a story of a strange people and a curious form of life in Stringtown County, Ky. Etidorhpa has also been recently published in popular form, several chapters, which were omitted when it was first printed, having been restored.

HANNAH E. LONGSHORE, the first woman to practice medicine in Philadelphia, died October 15th. It is said that the sneers, ridicule and obstacles she encountered at that time might have driven any one less reliant from the field. Male physicians refused to consult with her because she was a woman, and

druggists refused to fill her prescriptions. It is said that teachers in the public schools instructed their pupils not to walk on the streets with Miss Longshore, "because her mother was a woman doctor." To meet the opposition, Mrs. Longshore carried her own medicines. Conscious merit kept her steadfast, and she at last began to reap her reward. By the end of her third year her practice had increased to such an extent that she was compelled to give up her lectures to women, which had met with such success, and resign her position in the Woman's Medical College. She made such a success during forty years of activity that she retired with a modest fortune, and it was said that her practice was larger, with one exception, than that of any other woman physician in the United States.

SUSAN HAYHURST'S twenty-fifth anniversary as pharmacist of the Woman's Hospital, Philadelphia, was celebrated by a reception given by the Board of Managers on October 1st, at the hospital. Dr. Hayhurst has probably done more for young women in pharmacy than any one else, as she not only regularly employs women assistants, but many come to her to gain a practical knowledge of pharmacy.

CHARLES W. PARSONS, identified for nearly twenty-five years with pharmaceutical education and journalism, is now President of the American Correspondence University. The value of home study as of university extension work is becoming more appreciated by educators as being the entering wedge to collegiate and university work by those who for various reasons are not attendants at our colleges. The course in pharmacy as conducted by Mr. Parsons in the American Correspondence University is no doubt a systematic course of such a character that will benefit pharmacists who have not had the advantages of a college education. The course, it should be stated, is not intended to take the place of a college education.

PRESIDENT WILLIAM MCKINLEY.—The official report on the case of President McKinley has been published in a number of medical journals. Whatever may be said of the case in the light of modern progress in medicine, the lamentable fact was that the doctors in attendance allowed the nation to believe for some days that he would recover. The result was that the shock of his final collapse and death was as great as the first news of the assassin's dastardly crime.

VON MUELLER NATIONAL MEMORIAL FUND.—The Executive Committee to consider the best form for the memorial to take, recommended to the subscribers that the money available be devoted to the institution of a medal and a prize, to be awarded at intervals of not less than two years, to the author of the most important contribution to natural knowledge published within the British dominions, not more than five nor less than one year prior to the date of the award.

SOME DOCTORS OF THE OLDEN TIME.—In a valuable paper, read before the Lebanon County Historical Society, J. H. Redsecker has given some brief and interesting sketches of some of the old doctors of Lebanon, Pa. It is very desirable that the history of the earlier medicine and pharmacy be written, as it will be both interesting and valuable to students in the years to come.

A NUMBER OF BOOK-PLATES, designed by various persons, have been separately printed by the Pharmaceutical Review Publishing Co., Milwaukee. These plates are interesting and valuable to designers, authors, and others.

POPULAR GERMAN NAMES of domestic drugs and medicines, compiled by Fr. Hoffmann, has been revised and enlarged and may be obtained of the Pharmaceutical Review Publishing Co., Milwaukee.

THE THEORY OF ELECTROLYTIC DISSOCIATION, as viewed in the light of facts recently ascertained, is considered by L. Kahlenberg, with the co-operation of A. A. Koch and R. D. Hall, in Bulletin of the University of Wisconsin, No. 47.

FEEDING OF INFANTS AT PUBLIC EXPENSE.—While it is universally recognized that improper and deficient feeding is the principal cause of infant mortality, and it is conceded that the ideal and universal infant food has not yet been devised, it is, however, a matter of common knowledge that the greatest sufferers from inadequate and improper food are the children of the poor. "A project has recently been mooted in England, which, if carried out, might go far to effect the solution. The proposal alluded to is that children of the poor should be fed at the public expense. *The Hospital*, referring to the matter, suggests that some of the money that is so lavishly spent on education, might, with advantage, be devoted to the feeding of infants, and asks whether it would not be better to spend public money for a short time during infancy in securing that they shall grow up strong and straight and fit to earn a living, rather than to spend money in their support during these long years in after life, when, in consequence of their imperfect development, they have become inmates of workhouses, reformatories, and jails. The scheme reads utopian and visionary, but although perhaps at present impracticable, it yet contains the germs of sense. Any plan that will tend to improve the stamina of the human race and to stay the present fearful infantile mortality is at least worthy of attention."

A STRANGE CAUSE OF FIRE.—Fire may be caused by a bottle of water standing harmlessly on a table. A correspondent writes, showing how this may be the case:

"In my laboratory, the other day, I detected the odor of burning wood, and, seeking the cause, noticed a tiny wreath of smoke rising from the counter. Setting aside a flask of water that stood close by, I sponged over the burning spot with a damp cloth. Shortly after I again detected the odor of burning wood, when, to my surprise, I discovered another burning spot on the table close to the water flask. The flask was standing in the sunlight, thereby concentrating the rays to a focus on the top of the table, acting in this case as a burning glass. A handful of highly combustible material was thrown over the burning spot, catching fire almost immediately. I cite this instance merely as a warning to chemists and apothecaries who may not realize how easily a fire may be started in their storerooms by the sun shining through bottles, flasks, and carboys of liquid, converting them for the time being into burning glasses of great power. I have in mind now the instance of a fire originating in a storeroom from this cause."

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NOTES AND NEWS.

PENNSYLVANIA STATE PHARMACEUTICAL EXAMINING BOARD.—In the twelfth annual report it is stated that the entire number of registered pharmacists passed in nearly two years (ending January 31, 1900) was only 336, or about 20 per cent. of the total number examined.

THE ETIQUETTE OF ACADEMIC COSTUME.—Academic Costume should be used on all formal occasions where the members of an educational institution meet in a collective capacity, and as the commencement is the chief ceremony of the academic year, the use at commencement time may be taken as a guide for other occasions.

The cap is treated in a manner similar to the use of the military helmet or chapeau, and when academic bodies are in procession should be always on the head, the tassel hanging over the left eye. The cap is on the head during all the more important parts of the ceremony, but is usually removed when the officers and candidates take their seats, with the exception of the presiding officer, who will wear the cap during the entire exercises, with the exception of the time that he may be making a lengthy address or during the delivery of addresses to the general audience. When the candidates are upon their feet, standing up to receive any particular address in connection with the conferring of degrees, the cap, of course, should be on, as the whole body is then in full dress. When the presiding officer confers degrees, whether he be standing or sitting, he should, of course, have on the cap, and the candidates presenting themselves raise the cap from the head in salute to the presiding officer, he acknowledging it by a similar salute or with more dignity, perhaps, without salute.

The gown should rest easily on the shoulders of the wearer, and all motions of the hands in adjusting the gown should be avoided. A gown should be balanced in the making and secured to the person so that it will hang naturally and gracefully, and the hitching up of the gown around the shoulders, which so often is seen in the pulpit and on the platform, should be avoided, as it seems to indicate the unfamiliarity of the wearer with his apparel and indicates that the clothes do not properly fit the man. Gown, cap and hood should be worn with perfect freedom and unconsciousness.

The hood, which expresses the possession by the wearer of a degree either already received or certified as due to the candidate, is always worn on full-dress occasions. It becomes more symbolic when placed over the shoulders of the candidates, in the course of the ceremony, by an attendant connected with the official life of the institution, since it shows that the hood has the same significance as the diploma, which is conferred at the same time; however, many institutions find it more convenient to have its candidates come up for their degrees with the hood already on their shoulders, the candidate being invested with it after due certification by the authorities that he is to be raised to the dignity of the degree indicated.

The symbolism of the hood is most interesting, showing by its cut whether it is pertaining to the bachelor, master or doctor degree; by the velvet trimming, as to whether the degree is of arts, science, philosophy, theology, laws, medicine, pharmacy or other department of learning to which degrees pertain,

while by the color or colors displayed in the hood lining, one is reminded that the degree has been conferred by the institution that uses the colors shown as its official colors.—*Cotrell and Leonard, Albany, N. Y.*

THE NINETEENTH CENTURY.—The progress made during the past century is a subject in which every one is interested, and the New York *Evening Post* and the New York *Sun* have taken up the subject in a way that is very creditable. The *Post*, in its issue of January 12th, published some thirty-eight or thirty-nine articles on as many different subjects and by as many different authors, the subjects ranging from astronomy and physics to painting, architecture, literature, finance and economics. The *Sun* is publishing a series of Sunday articles, thirteen in all. Those of scientific interest are as follows: "Evolution," by Alfred Russel Wallace (December 23d); "Chemistry," by Prof. W. Ramsay (December 30th); "Archæology," by Professor Flinders-Petrie (January 6th); "Astronomy," by Sir Norman Lockyer (January 13th); "Philosophy," by Dr. Edward Caird (January 20th); "Medicine," by Prof. William Osler (January 27th); "Surgery," by Prof. W. W. Keen (February 3d); "Electricity," by Prof. Elihu Thomson (February 10th); "Physics," by President F. C. Mendenhall (February 17th).

MAGAZINE SCIENCE.—Referring to Nikola Tesla's article in *The Century Magazine* for June on "The Problem of Increasing Human Energy," a writer in *Marine Engineering* (vide *The Locomotive*, 1900, p. 124) says:

"This dazzling contribution to modern unscientific research reads like nothing so much as an essay on Christian Science, so profound is it in the ambiguous nothingness whereby it leads through the intricacies of incoherency unto the climax of absolute asininity. This climax is reached (for us) in the following statement, which occurs on page 198 of the June *Century*: 'Steamers and trains are still being propelled by direct application of steam power to shafts or axles. A much greater percentage of the heat energy of the fuel could be transformed into motive energy by using, in place of the adopted marine engines and locomotives, dynamos driven by specially designed high-pressure steam or gas engines, and by utilizing the electricity generated for the propulsion. A gain of from 50 to 100 per cent. in the effective energy derived from the coal could be secured in this manner.' It is no doubt beyond the comprehension of the literary gentlemen who publish *The Century Magazine* to understand that progress in marine propulsion is slow, very slow, and that there is nothing in the entire domain of scientific research that promises any hope of being able to transform a much greater percentage of the heat energy of fuel into motive energy by employing dynamos driven by specially designed high-pressure steam or gas engines. It is to be expected, however, that, as those responsible for the statements made in what has been considered one of the foremost literary magazines of the country, they should appreciate their lack of expert knowledge, and by procuring suitable editorial assistance safeguard their readers, the reputation of the magazine, and their own sense of right. Under the circumstances, we most unqualifiedly pronounce the statement here reproduced from *The Century Magazine*, regarding marine propulsion, to be a crude and ignorant 'fake.'"